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A CASE OF ADHESIVE CONSTRICTIVE PERICARDITIS (PICK'S DISEASE)

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CONCEIVABLY, adhesive constrictive pericarditis might be called a newly-recognized form of heart disease. Other forms, as we have recognized them, may be listed as: (1) congenital heart disease; (2) rheumatic valvular disease; (3) acute bacterial endocarditis; (4) subacute bacterial endocarditis; (5) angina and associated acute or chronic coronary artery disease; (6) the myocardial inflammations and degeneration with hypertrophy and dilatation; (7) the diseases of the aortic commissure; and finally (8) the various pericarditides of acute or chronic nature other than that form referred to in the title. The condition we are describing (Pick's disease) is also known as indurative mediastino-pericarditis, *concretio pericardii*, and, if associated with thickening of the capsule of the liver and spleen or with chronic peritoneal inflammation—pericarditic pseudo-cirrhosis.

Essentially, Pick's disease¹ is the involvement of the pericardial layers in a fibrosing, adhering form of pericarditis, affecting at times more particularly the visceral layer of the pericardium, when by its action it obstructs the inflow from the great veins into the auricles, restricts the expansion of the heart's chambers in diastole, and compresses the coronary circulation, forestalling by the latter performance any hypertrophy of the labouring heart, so that the heart remains small. In this direction it differs from the usual form of adhesive pericarditis, in which hypertrophy ensues as a result of the adhesion of the parietal layer of the pericardium to the chest wall and adjoining structures, a condition which interferes markedly with the systolic action of the heart, and leads gradually to gross enlargement, with the production of

certain well known signs, such as systolic indrawing of the præcordium, and the tugging at certain points of the diaphragm's attachments (Broadbent's sign).

It is obvious from all descriptions, and equally obvious, when we consider the pathological process involved, that no sharp line can separate the end-results in cases of chronic thickening of the pericardium and its adjoining structures. We infer that in chronic *constrictive* adhesive pericarditis the progressive thickening and shrinking of the outer and inner layers of the pericardium must begin to constrict the heart early, and must outdistance changes which are taking place in the tissues immediately outside and surrounding the heart and pericardium, while in the better known process of thickening of the parietal pericardium, with adhesion to the chest wall, obstruction to the coronary circulation, compression of the heart's chambers, and constriction about the venous orifices may not have taken place.

Pick's disease, with fibrosing, contracting pericarditis, is thus a matter of inflow stasis, as opposed to the general state of affairs in hearts enlarged as a result of adhesions of the pericardium to external structures. As a result of the constricting pericarditis the heart remains small and its activity is more impaired in its diastole. The inflow stasis just mentioned is produced by two causes, first, constriction about the orifices of the great veins, and, second, restriction of diastolic expansion of auricular and ventricular chambers. The heart does not dilate because of the mechanical compression exerted by the constricting pericarditis, neither can it

hypertrophy because of interferences with the coronary circulation.

Chronic adhesive constrictive pericarditis leads eventually to a condition of cardiac compression, a condition which is more often arrived at in a precipitate manner, as in the more readily recognized acute constrictive compression caused by the sudden accumulation of fluid or blood in the pericardium. In both the acute and chronic forms of compression, according to Beck,² a triad of physical signs is presented. In the acute form, the effused fluid in the pericardium presses upon the heart and great veins, interferes with the mechanism of the heart, and gives rise to the first compression triad: (1) falling arterial pressure; (2) rising venous pressure, and (3) a small, quiet heart. With the falling arterial pressure there are seen anxiety, restlessness, pallor, cold moist skin, weak pulse, unconsciousness, and if the pressure is not quickly relieved, death. In these cases of acute compression of the heart, fatal results will follow if the venous pressure rises quickly to 16 cm. of water. The normal venous pressure is usually given as 4 cm.

In the chronic constrictive pericarditis, as seen in some cases of Pick's disease, the triad most often noted is: (1) high venous pressure; (2) ascites; (3) a small, quiet heart. If the rise in the venous pressure is a matter of years death is not produced until this pressure exceeds 38 cm. of water, that is, double the figure that the heart can work against if the compression takes place rapidly. The marked venous stasis, often seen in the veins of the neck, which refuse to empty with inspiration, or with the patient in the erect position, sooner or later incites the production of an exudate in the abdominal cavity which holds a high fibrin content. It is the high fibrin content of the exudate which produces the frosted liver and spleen in Pick's disease, and not infection.

In recent years the recognition of the existence of chronic adhesive pericarditis has assumed an importance not hitherto considered, by reason of the fact that relief of symptoms may, in some cases, follow surgical operations undertaken for the removal of the cardiac compression. The cardiolysis of Brauer,³ or the "thoracolysis præcardiaca", separates the heart from its adhesions to the chest wall, at the same time removing part of the chest wall itself.

These measures have been associated with a reasonable degree of success. Decortication of the heart itself (Delorme's operation) was suggested by the well-known operations performed for the decortication of the lungs, and in 1929 Churchill⁴ was able to collect the reports of 37 such cases.

The case for surgical intervention in the treatment of chronic constrictive adhesive pericarditis, as it stands today, is well presented by P. D. White,⁵ in his St. Cyres lecture at the National Hospital for Diseases of Heart, London, on July 10, 1935. The lectures mentioned detail an additional series of 15 cases of adhesive constrictive pericarditis. The diagnosis was confirmed by operation in 12, by autopsy in 1, and rested on clinical and x-ray evidence in the 2 remaining. In this group the ages ranged from five and one-half to fifty years. Etiologically, the cases were divided as follows: (1) tuberculosis in 2 cases; (2) polyserositis due to pneumonia in 2; (3) sepsis in the mediastinum in 1; (4) uncertain, in 10. White is very definite in saying that no cases were due to rheumatic fever. "It is of further interest that a series of 1,000 children, with rheumatic infection, studied at the House of the Good Samaritan in Boston, and followed over a period of ten years, has shown in not a single instance any evidence of chronic constrictive pericarditis, even though acute pericarditis has been noted during their active rheumatic infection." In his series the first symptom occurring was (1) dyspnoea in 4 cases; (2) abdominal enlargement in 3; (3) oedema of the ankles in 1; (4) oedema of face and abdominal enlargement in 1; (5) soreness in the right upper quadrant in 1. To be noted in connection with physical signs were absence of the apex impulse, the small size and quiet action of the heart, persistent fullness of the cervical veins, a large liver, restriction of the heart action as evidenced by the screen in roentgen-kymogram and paradoxical pulse.

The prognosis in Pick's disease without surgical treatment aiming at freeing the auricles and ventricles from constriction is unfavourable for health, and in some cases for life. Since operative procedures are being now advocated it will not be amiss to refer to some of the essential details in operating. "The left ventricle and auricle must be freed from constriction before

the right, so that the venous stasis is not transferred to the pulmonary circulation. Sharp dissection is preferable to blunt over the auricles, for the tough pericardium is less likely to tear than is the softer tissue of the auricle. Care must be taken not to work too long with the heart compressed, with its function generally impaired, or with its rhythm too grossly interfered with. No attempt is made to replace the ribs or sternum removed from the anterior chest wall, nor to replace them with fascia or other materials. The incision is completely closed; the fluid that accumulates in the pericardium post-operatively is drained through a sinus especially made into the left pleural space, whence it can be aspirated from time to time." In passing, one notes that S. E. Johnson⁶ has completed an instrument, called the roentgen-kymogram, which is extremely useful for measuring the excursions of the heart in emptying and filling. By the use of this instrument diagnosis may be confirmed, and, post-operatively, the success of the procedure may be measured.

The case to be reported is the only one of adhesive constrictive pericarditis seen at Christie Street Hospital since its opening 15 years ago.

CASE REPORT

W.J.F., aged forty-five years, was in good health until 1916, when he was invalided from France with pulmonary tuberculosis, as indicated by positive sputum findings. After a period of sanatorium treatment he was discharged, and was under outside care until 1926. Later he was under observation in the Byron Sanatorium, where the x-ray findings were those of right pleural effusion and a large accumulation of fluid in the pericardial sac. There did not appear to be any activation of pulmonary tuberculosis in the parenchyma of either lung. His sputum at this time was negative for tuberculosis. In his history of 1927, at the Byron Sanatorium, there is the note of "some retraction of the right apex and x-ray evidence of thickened pleura and fibrosis in the right chest".

The following year, he was found complaining of dyspnoea, pain over the præcordium, irregular heart action, and vague abdominal symptoms. At this time examination revealed some flattening over the right upper chest but failed to show anything in the abdomen. His heart was displaced to the right by a mediastinal shift, was quiet, and showed an occasional extra-systole. In 1929 an x-ray showed marked drawing of the heart to the right without apparent enlargement of that organ.

The patient first presented himself to Christie Street Hospital in 1930. In addition to the above history he reported that fluid had been aspirated from his right chest on three occasions. He had no positive sputum findings during his admission. The general physical examination and x-ray findings gave no evidence of reactivation of his old tuberculosis. The serology tests, as devised by Dr. Caulfield, gave a third-class inhibitive, and negative tuberculo-complement fixation test. The interpretation of this indicated that at this time no activity was present. The diagnosis was thus given as

"Apparently arrested pleural and peri-bronchial tuberculosis".

In 1933, he was found again reporting for treatment. At this admission he had an unusual degree of cyanosis. The retraction of the right apex was more evident, and by the x-ray a mediastinal shift was very marked. Two years later the interference with circulation had become disabling. He was markedly cyanosed, with oedema of feet, ankles and lumbar region, and with a liver enlarged to a handsbreadth below the costal margin. The heart at this time was fibrillating, and the blood pressure was 120/90. He passed to his own control, but steadily failed in the next two months.

On his final admission, in August, 1935, he showed marked respiratory distress at rest. The right chest was restricted and the heart drawn to the right. Throughout the next few months aspiration removed various quantities of fluid from both pleural cavities; on one occasion, 700 c.c. from the left and 100 c.c. from the right. The fluid was bloody, and for various reasons its formation was attributed to myocardial failure rather than to advancing tuberculosis. A very high negative pressure was found in the right pleural space. He gradually lost ground and died on February 21, 1936.

During his residence in the hospital the patient was considered to be suffering from the effects of a progressive fibrosis of the upper part of the right lung, and from myocardial failure with auricular fibrillation. The retraction of the right lung was early recognizable, as was the shifting of the mediastinum to the right. A gross enlargement of the heart was not determined, and with thickening of the tissues to the right and the accumulation of fluid in the left this might be held excusable. A reproduction of one of the plates is here presented (Fig. 1). Not being as familiar with the signs of constrictive adhesive pericarditis as we might now claim to be, with White's articles before us, we may have failed to notice the fullness of the cervical veins and the limited excursion of the heart in diastole and systole. Systolic indrawing of chest wall was not in evidence. The persistent rapid fibrillation and flutter probably attracted more attention than any visible limitations in the diastole and systole of the heart during the process of screen examinations. Notes as to the force and extent of the heart's systole, the presence or absence of paradoxical pulse, the filling and emptying of the veins of the neck, are unfortunately not to hand. One's suspicion of the underlying condition in the heart and pericardium had not been aroused. It had even been suggested that the retraction of the right chest and an increasing negative pleural pressure were in themselves enough to bring up the question of inducing an artificial pneumothorax or even of undertaking some thoracoplastic operation. It is quite possible that the degree of negative pressure in the right chest was sufficient to keep the cervical veins well emptied. One would feel that in this particular case of Pick's disease operative performances would have to include both the release of the cardiac compression and the readjustment of the intrapleural pressure.

At autopsy evidence of congestive failure was presented, in the oedema of the dependent tissues and in the accumulation of fluid in the abdomen and chest. Frosting or "icing" of the abdominal contents was only to be noted over the spleen. The liver was enlarged and roughened, presenting the appearance of a cirrhotic organ. Both kidneys were contracted, granular, dark red, and firm.

The right pleural cavity was obliterated in great part by adhesions. There was a small encapsulated effusion over the base of the right lung. The whole upper lobe of the right lung was covered and infiltrated with firm fibrous tissue, which in its retraction had brought about sinking of the upper right chest and displacement of the mediastinum to the right. The mediastinal pleura was firmly attached to the pericardium,

was thickened and firm, as was, to a lesser degree, the pleura elsewhere over the lung. Throughout the upper lobe of the right lung, there were a few small areas of healed tuberculosis.

The left pleural cavity showed some fibrous adhesions, but the process here was the minimal as compared with the condition in the right chest. There was room in the pleural cavity for 1,000 c.c. of blood-stained fluid. The left upper lung was expanded; the left lower lobe was partially collapsed and showed signs of congestion, with considerable oedema. Throughout the mediastinum the thickening and adhesions were such that the heart, lungs, and pericardium had to be removed *en masse*. In removing the sternum it was noted that there

were but few adhesions between the parietal pericardium and the anterior chest wall.

The pericardium, with both layers firmly adherent, appeared as a dense white structure, 2 to 3 mm. thick, over the presenting part of the heart and 1 to 2 cm. at the cardio-diaphragmatic angle on the right. This dense, white envelope of thickened tissues completely surrounded the heart, extended upward over the auricles, compressing all the great vessels entering and leaving the heart, and became continuous with the process which had converted the upper lobe of the right lung and its pleura into firm, scar-like tissue. Separation of the upper right lung from the mediastinal tissues and pericardium was only possible by fine dissection. Some extension of the

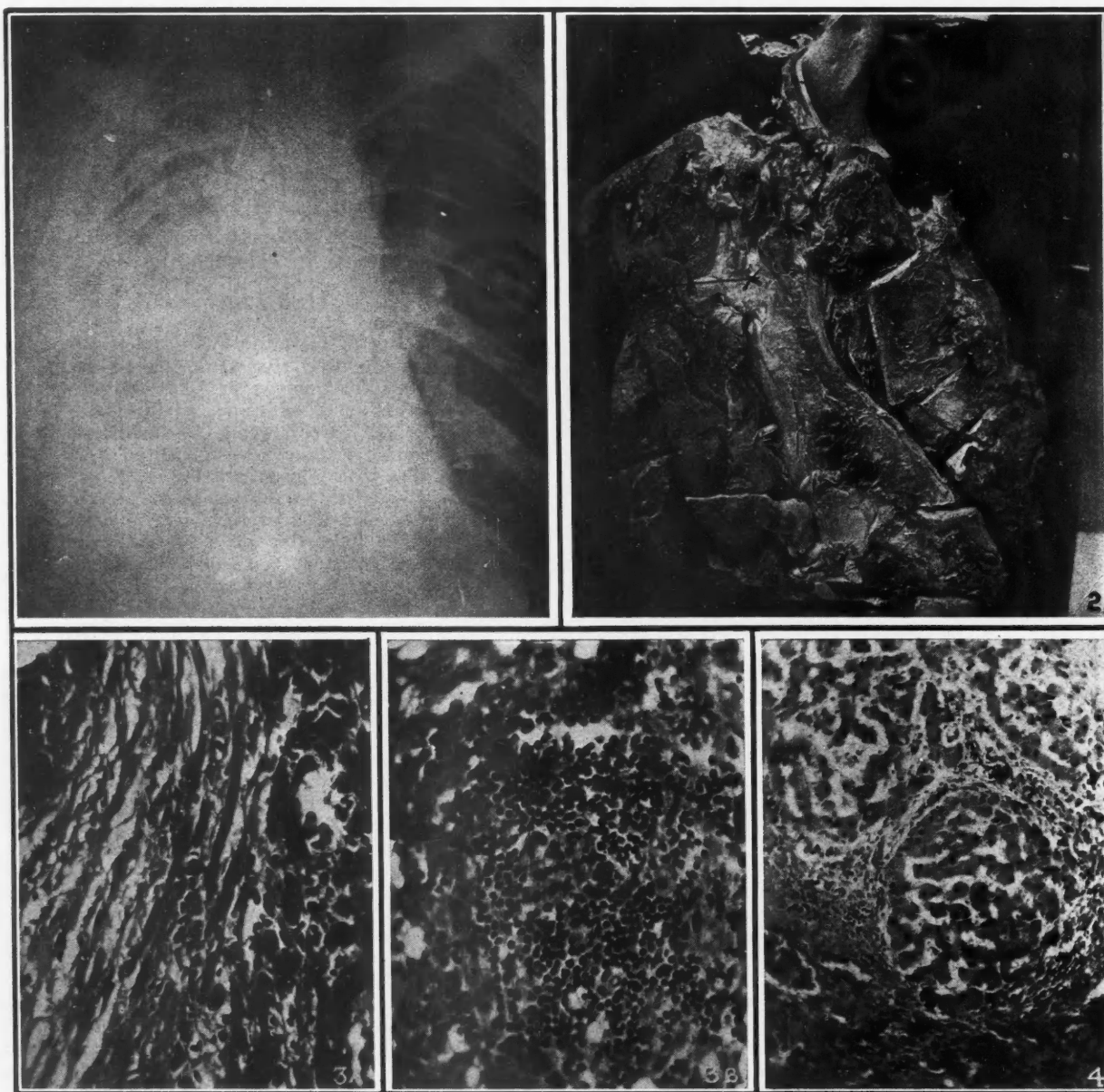


Fig. 1.—Chest showing falling of the right side and shifting of mediastinum to the right. Outlining of heart and pericardium not possible owing to shadows cast by thickened pleura and effusion. Fig. 2.—Heart and lungs removed *en masse*. The dense casing over the whole pericardium is well shown. The pericardium at lower left measuring $\frac{1}{2}$ cm. in thickness. The dense adhesions to the upper mediastinum and right apex cannot be broken. The right ventricle shows at upper right of the picture. "X" indicates an area of calcification. Fig. 3A.—Heart (pericardial surface) showing outer layers of heart muscle being infiltrated and replaced by fibrous tissue of the adherent pericardium with subsequent calcification. Fig. 3B.—Extra pericardial connective tissue showing a few centrally placed endothelial cells surrounded by a zone of lymphocytic and plasma cell infiltration. Structurally these areas suggest tubercle as a possible etiological factor. Fig. 4.—Liver showing congestion and diffuse fibrosis with isolation and strangulation of liver lobules.

process has taken place into the left mediastinum and towards the mediastinal pleura of the left upper lobe. Separation of the left lower lobe from its adhesions to the pericardium was accomplished without much difficulty. The right lower lobe and pleura could not be detached from the heart without dissection or cutting. On account of the stiffening and contraction of the tissues as a result of immersion in formalin it was difficult to make accurate estimations of the size of the caval openings or of the diameter of the aorta and pulmonary artery. A little finger entered with difficulty through the superior vena cava and the inferior vena cava admitted a larger finger with difficulty. The aorta and pulmonary artery appeared both narrowed and compressed. The openings of the coronary arteries were free and admitted a probe; dissection showed these vessels to be in fair condition in the first part of their course.

In viewing the picture, (Fig. 2), one realizes that as a result of fixation and of distortion of the mediastinum, the right ventricle is now forming the left border of the heart area. The right auricle is twisted forward and to the left. The lower right-hand corner of the pericardium—1 to 2 cm. thick occupies the mid portion of the picture. Deep below this thickened tissue is the much compressed right auricle. Much of this thickened tissue is like cartilage in its hardness, and in its upper part (at X) there is an area of calcification.

The right ventricle was opened and the thinness of its wall was apparent. The separation of the two layers of the pericardium was done without difficulty; the relative smallness of the heart chamber was apparent. The small contracted left ventricle with its thickened pericardium appeared as if squeezed by the dense sheeting of thickened tissue over the base of the heart.

The measurements of this heart, in an adult 5 feet, 10½ inches and weighing 131 pounds, were roughly—greatest transverse diameter 100 mm.; from the right lower angle to the mid-left border, 113 mm.; from apex to right mid-border, 106 mm.; from apex to aortic valve, 75 mm.; from apex to pulmonary valve, 100 mm. The left ventricular wall measures 15 mm. and the right, 6 mm.

On opening the pericardium it was found that although the parietal layer was markedly thickened, and in one area calcified, it could yet (in some areas) be freed of its adhesions to the visceral layer without great difficulty, and it is conceivable that by blunt dissection one could readily separate the two layers of the pericardium except over the few areas of calcification. The visceral layer, however, white, thick, firm, completely

enveloped the heart and would only be removable with greatest difficulty. Section of the heart wall showed a muscle of chocolate-brown colour, infiltrated with striae of fibrous tissue, and with an occasional small area of calcification. The valves were free and the openings of the coronary arteries showed no clear evidence of compression. The aorta, as shown in the figure, was reduced in diameter, measuring 37 mm. at a point 80 mm. above the valves. The pulmonary artery, much compressed, passed through the dense mass of scar tissue enveloping the base of the heart and seemed also much reduced in its diameter, measuring, roughly, 25 mm. In making these measurements due allowance must be made for the shrinkage produced by formalin.

The examinations of many sections of the fibrosing tissue made by Dr. Loughheed and Dr. Norwich showed no clear evidence of underlying tuberculous or rheumatic disease. An extreme degree of fibrosis and small areas of calcification were noted. Here and there in some sections are areas of centrally placed endothelial cells, surrounded by a zone of lymphocytic and plasma-cell infiltration. Structurally, these areas suggest tubercle as a possible etiological factor. This is more particularly marked in the extra-pericardial connective tissue. No such suggestive findings were made in the pericardial tissues themselves. A diffuse fibrosis, with isolation and strangulation of the liver lobules, was in evidence, and the same fibrotic process had involved the spleen and its capsule.

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References to the surgical treatment of constrictive adhesive pericarditis will be found in full in the articles by Griswold, Churchill and publications by C. S. Beck.

TUBERCULOSIS IN NURSES.—A Gullbring draws attention to the fact, revealed by recent studies in Scandinavian institutions for the sick, that the frequency with which probationers and nurses contract tuberculosis is much higher in general hospitals than in sanatoria. This comparison does not reduce to negligible proportions the risks of nursing the tuberculous in sanatoria, but it emphasizes the unsatisfactory character of the conditions under which nurses work in general hospitals. In the author's opinion the most important difference in the two classes of institution concerns the work hours. In a general hospital probationers begin work at 6 a.m. and end it at 8 p.m., with only three hours in the interval for food and rest. To this eleven-hour day is added night duty every fourth night. These working conditions are

the more onerous for the fact that most probationers are recruited from homes in which continuous and heavy physical work has been conspicuous by its absence. In the author's hospital the sixty-hour week between 1928 and 1934 has since been reduced to a fifty-four-hour week. With regard to tuberculous infection, he has found that the probationers who were tuberculin-negative on joining his hospital showed a subsequent tuberculosis rate of 8.4 per cent, whereas it was only 2.8 per cent among the nurses who were already tuberculin-positive when tested as probationers. This striking difference has impressed the author with the desirability of not setting tuberculin-negative probationers to work forthwith on tuberculous patients.—*Hygiea*, Stockh., December 31, 1936, p. 865. Abs. in *Brit. M. J.*

THE RELATIONSHIP BETWEEN THE RATE OF EMPTYING OF THE STOMACH AND THE SUGAR TOLERANCE*

(WITH PARTICULAR REFERENCE TO "LAG" GLYCOSURIA)

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SEVERAL more or less distinctive types of response to the glucose tolerance test may be recognized, including that variety which is characterized by an abrupt rise of the blood sugar concentration to an unusually high level followed by an equally rapid fall to the normal range again within two hours. This temporary hyperglycæmia is frequently accompanied by a transient glycosuria.

Attention has been directed to this particular type of response to ingested glucose by MacLean¹ who applied the terms "lag" blood sugar curve and "lag" glycosuria with reference to it. Mosenthal² distinguished the phenomenon by the expression "high" blood sugar curve, while the Scandinavian observers^{3, 4} apparently included the anomaly in their "transitional" group of blood-sugar curves. Lawrence⁵ considered the word "oxyhyperglycæmia" to be appropriate for the sharp, steeple-like rise of the curve which is the essential feature of the irregularity.

There is no concurrence of opinion with regard to the interpretation of the so-called "lag" blood sugar curve, although it is generally agreed that it is not indicative of a true diabetic condition. Maclean's original thought regarding the matter was that those who exhibited the peculiarity required a higher concentration of blood sugar than is usual to stimulate their glycogenic function, but when once started this function was effective and adequate. In other words, the condition was regarded to be of the nature of a "lag storage" phenomenon. While Maclean admitted that very rapid absorption must have been taking place in his patients who showed the anomaly, he maintained that the behaviour of the blood sugar was dependent upon a delay in the intervention of the mechanism for keeping the blood sugar below the customary threshold value. The latter explanation was largely hypothetical, and

was not supported by convincing experimental or clinical evidence. In 1927, the author⁷ advanced the suggestion, on the basis of certain clinical observations, that the so-called "lag" blood sugar curve could be the result of the rapid or excessive absorption of the glucose from the intestine, whereby the portal blood became laden with sugar, and, as a consequence, the glycogenic property of the liver was temporarily overwhelmed. In support of this conjecture examples of "lag" blood sugar curves obtained from patients with rapidly emptying stomachs were recorded. Leyton,⁸ in a paper on the diagnosis of diabetes, in 1930 explained the occurrence of a typical "lag" type of curve in one of his patients (Case 10) on the ground of the "absorption of sugar at a rate greater than the average". It should be added, however, that eleven months later this same patient responded to the sugar tolerance test with a diabetic type of curve, although no symptoms of the disease were manifest at that time. Recently, Lawrence^{5, 6} independently arrived at the conclusion that the "lag storage" variety of blood sugar curve seemed to be due to the rapid intestinal absorption of sugar and not to any defect of the carbohydrate metabolism. It was his impression that this type of curve will seldom be encountered, if only venous blood is employed for the blood sugar estimations, an opinion which is not wholly in accord with existing data.

ADDITIONAL OBSERVATIONS

In view of the fact that relatively little attention has been devoted to the practical aspects of the vagaries of intestinal absorption in human beings, the following observations are presented as further evidence of a probable relationship between the rate of emptying of the stomach and the results of the sugar tolerance test. The findings may afford some clue concerning the causation of the "lag" type of blood sugar curve.

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For the investigation to be described the motility of the stomach was studied radiographically and by means of fractional gastric analysis in patients who exhibited "lag" blood sugar curves. Also, glucose tolerance tests were performed on persons who were known to have rapidly emptying stomachs. The standard sugar-tolerance test was employed, using 50 g. of dextrose dissolved in 200 c.c. of water. In every instance the test was done in the morning with the subject in the fasting state, and the blood sugar estimations were performed on samples of venous blood by the Folin-Wu technique.

In the author's experience, the "lag" type

of blood sugar curve has been encountered only in subjects who presented some indication of an excessive rate of passage of the contents of the stomach into the intestine. It has been observed frequently following the operation of gastroenterostomy. In other words, there appears to be a relationship between the emptying time of the stomach and the character of the blood-sugar curve. As confirmation thereof a series of illustrative cases are presented. The significance of the observations with reference to "lag" glycosuria will be discussed later in this paper.

The blood-sugar curves obtained from 20 patients have been separated into two groups. Those included in Group I (Table I and Chart

TABLE I.
TYPICAL "LAG" BLOOD SUGAR CURVES

Case No.	Age	Sex	Blood Sugar (mg. per cent) before and after the ingestion of 50 g. of dextrose					Glycosuria			Remarks
			Fasting	½ hr.	1 hr.	1½ hrs.	2 hrs.	Fasting	1 hr.	2 hrs.	
1	41	M	109	356	181	98	83	0	++++	+	3 years after gastroenterostomy. Stomach acts as a "funnel", emptying its contents almost immediately and completely into intestine.
2	52	M	88	220	98	78	80	0	+++	0	Carcinoma of stomach; patent pylorus. Opaque meal rushes through stomach without delay.
3	40	M	110	200	100	80	88	0	trace	0	Nodular goitre with thyrotoxicosis. At 2 hours 75% barium passed out of stomach; empty at 2½ hours. No starch in 1½ hours. Bile present in last 5 specimens of fractional gastric analysis.
4	35	M	78	232	168	90	68	0	+	0	10 months after gastroenterostomy. Opaque meal passes directly into intestine.
5	42	M	135	238	176	145	105	0	trace	0	2 years following gastroenterostomy. No investigation of gastric functions.
6	38	M	123	221	176	95	64	0	0	0	4 years after gastroenterostomy. Stoma functioning well; small amount of barium passes through pylorus also.
7	31	M	110	183	115	78	95	0	?	0	Stomach empty in one hour by x-ray examination.
8	37	F	112	186	178	145	114	0	trace	0	Stomach empty in 5 hours by x-ray. Achlorhydria. Slight persistent glycosuria.
9	36	M	76	184	151	66	39	0	++++	++	Stomach begins to empty immediately through both gastroenterostomy opening and pylorus. Completely empty in 3 hours (x-ray).
10	56	F	110	230	228	180	110	0	++	0	Two hours after barium meal only about 2% remains in stomach; at 4 hours completely empty. Stomach empty in 1½ hours by fractional gastric analysis. Achlorhydria.

1) consist of 10 examples of the typical "lag" type of curve in which the fasting blood sugar concentration, except in one instance (Case 5), fell within the generally accepted normal range. Following the ingestion of the dextrose solution there was a sudden rise of the blood sugar concentration to an abnormally high level in one-half hour. With the exception of one case (No. 10), there followed an abrupt decline of the curves to reach normal or subnormal levels within two hours after the administration of the sugar. The majority of the subjects had a temporary glycosuria.

In Group II (Table II and Chart 2) all the patients presented a normal fasting blood-sugar

concentration, but following the ingestion of the dextrose the rise was not as abrupt and the decline of the curves was not as prompt or as complete as in the examples depicted in Group I. The possible significance of these differences will be referred to below.

DISCUSSION

Each patient in this series presented two characteristics, namely, a rapidly emptying stomach and an unusual blood-sugar curve. Of course, the mere association of these two deviations from the normal does not prove that the latter is dependent upon the former. The coincidence is, however, a point in favour of the view that the "lag" type of blood sugar

TABLE II.
ATYPICAL "LAG" BLOOD SUGAR CURVES

Case No.	Age	Sex	Blood Sugar (mg. per cent) before and after the ingestion of 50 g. of dextrose					Glycosuria			Remarks
			Fasting	½ hr.	1 hr.	1½ hrs.	2 hrs.	Fasting	1 hr.	2 hrs.	
11	46	F	93	188	209	170	116	0	++	+	Cholecystitis. Stomach contracted and small; empties very rapidly due to patency of pylorus.
12	67	M	80	182	200	160	68	0	+	++	Abnormal motility of stomach, a large part of barium meal passing into intestine in a few minutes after its ingestion. In 5 hours stomach completely empty.
13	55	M	119	267	247	205	109	0	+	trace	Stomach empties very rapidly and is completely empty in 2 hours.
14	45	M	115	237	281	119	73	0	++++	0	At 5 hours stomach entirely empty by x-ray examination.
15	36	M	113	265	245	167	132	0	+	trace	Stomach practically empty in 2 hours by x-ray examination; empty in 1½ hours by fractional gastric analysis.
16	43	M	89	154	271	190	102	0	0	0	Stomach empty in 1 hour by x-ray; empty in 1½ hours by fractional gastric analysis. Bile in every specimen.
17	60	F	69	148	169	159	150	0	+	0	Post-gastroenterostomy case. Barium meal begins to pass through g.-e. opening immediately.
18	61	M	109	188	170	163	138	0	?	0	Gastroenterostomy 8 years previously for duodenal ulcer. Stomach empties rapidly on x-ray examination by gastroenterostomy opening and by pylorus. Stomach empty in ¾ hour by fractional gastric analysis.
19	85	F	95	200	222	165	120	0	?	+	Stomach empty in 1 hour by x-ray examination.
20	49	M	92	129	166	153	133	0	0	0	Stomach empty in 2 hours by x-ray examination and in 1¼ hours by fractional gastric analysis. Achlorhydria. Bile present in last 3 specimens.

curve is related to the rapid and excessive absorption of sugar from the intestine.

To propound a theory is one thing; to offer reasonable affirmation of its validity is another. Indeed, the explanation just advanced is at variance with certain experimental observations regarding the rate and conditions of absorption of sugar from the intestine. Beginning with the experiments of Cori,⁹ who found that the rate of absorption of glucose from the intestinal tract of rats proceeded at a constant rate and was independent of both the absolute amount and the concentration of sugar present in the intestine, numerous investigations have been undertaken with reference to the problem of

animals. Accurate information pertaining to the rate at which glucose may enter the blood from the intestine of man is apparently lacking.

It is of interest to note that Magee and Reid¹¹ found that 0.75 M glucose was the optimal solution for absorption of this sugar in rats, cats and rabbits. When stronger solutions were fed to rats the results suggested that the stomach diluted them to a concentration of 0.75 M before the bulk was discharged into the intestine. The same workers regarded the systemic blood sugar curve as an index of the rate of absorption of glucose in anesthetized animals. Bennett and Dodds¹² observed that when a strong solution of glucose was ingested by a normal human

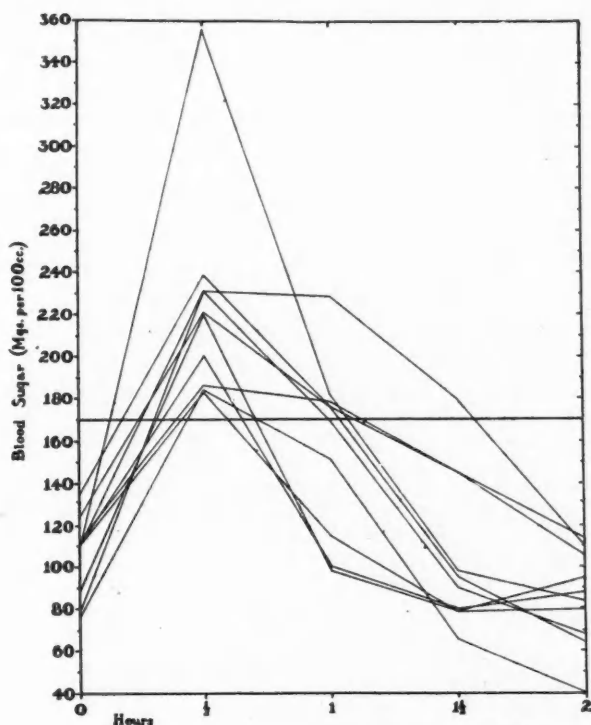


Chart 1.—Typical "lag" blood sugar curves obtained from patients with rapidly emptying stomachs, following the ingestion of 50 g. of dextrose.

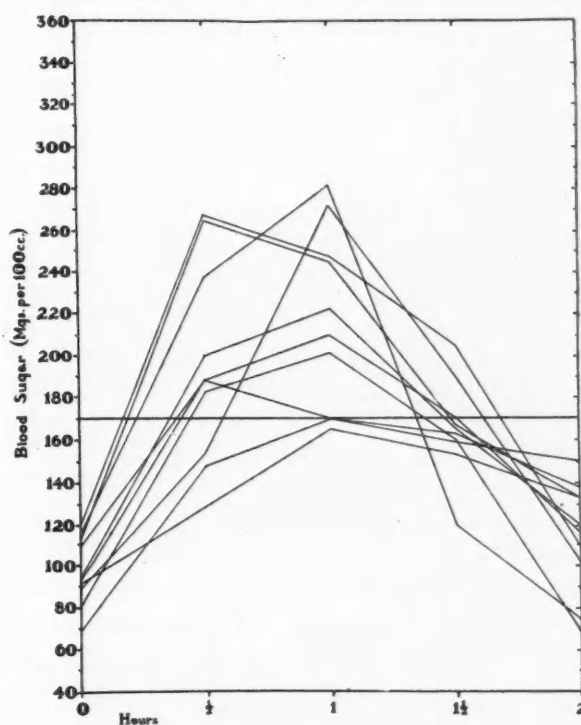


Chart 2.—Atypical "lag" blood sugar curves obtained from patients with rapidly emptying stomachs, following the ingestion of 50 g. of dextrose.

the intestinal absorption of glucose, with various conclusions. The present situation regarding the subject has been stated by Chaudhuri and Kahali¹⁰ as follows: "... unanimity of opinion about this important matter has not yet been reached. All workers in this field agree that absorption of glucose is a vital process, but the rate at which it is absorbed and the factors which influence it are as yet not clearly understood". All the available knowledge concerning the question of the intestinal absorption of glucose has been acquired by experiments on

being it was detained and diluted in the stomach and subsequently passed into the intestine gradually.

The stomach, including the pyloric sphincter, evidently does play a part in regulating the absorbability of ingested glucose. With regard to the patients referred to in this paper, the controlling influence of the pylorus was not operative in a normal manner, and the intestine was presented with the glucose solution, often precipitately, following its ingestion. Apropos of this topic, Korányi¹³ obtained steeply ascend-

ing and suddenly descending blood sugar curves by administering 100 to 150 g. of dextrose to patients who had undergone operations on the stomach, such as gastric resection and gastroenterostomy. In many instances, the blood sugar fluctuated from hyperglycæmic to hypoglycæmic values. On the ground of circumstantial evidence, therefore, it is not unreasonable to presume that the rapid and excessive absorption of sugar from the intestine occasioned by an abnormally speedy passage of the glucose solution into the intestine is at least one, if not the only, cause of the so-called "lag storage" type of blood sugar curve.

As Lawrence⁵ has pointed out, the terms "lag" and "lag storage" curve are misnomers, or, at any rate, they are misleading. In the typical example, the circumstance is, as he describes it, "the opposite of slow or lagging. It is brief, quick, sharp and the name 'lancet' or 'steep' has been suggested". The conditions are at least consistent with what might be expected to occur following a sudden addition of sugar to the circulation.

The question of the innocuousness or otherwise of this anomaly of carbohydrate metabolism is worthy of some consideration. Can it be a forerunner of a metabolic disaster? This query cannot be answered with certainty at present. As mentioned by Maclean,¹ some investigators have stated that the condition may possibly pass into a true diabetes. The case described by Leyton⁸ and referred to above is an instance in point. Apparently it was some such eventuality that the Scandinavian writers^{3,4} had in mind when they applied the term "transitional" to the type of blood sugar curve under consideration. Further, the character of the response to the glucose tolerance test of the patients in Group II (Table II and Chart 2) of the present series tends to support the view that the rapid passage of carbohydrate food from the stomach into the intestine for an indefinite period of time may lead to an ultimate deterioration of the power of storage; hence the supervention of an added factor prejudicial to the carbohydrate metabolism. Whether deficient or excessive secretion of the duodenal hormone which has been studied by Laughton and Macallum¹⁴ may be associated in any way with this development of deranged carbohydrate metabolism is problematical, but deserves mention. In any event it is conceivable that an

alimentary hyperglycæmia of the order under discussion may be followed by an actual "lag" on the part of the insulin-glycogen storage mechanism and eventually by a state of diabetes. Several of the patients in Group II approach the diabetic type with respect to their reaction to ingested glucose. Prolonged observation of such persons may solve eventually the problem of the significance of the "lag" blood sugar curve.

SUMMARY

Twenty patients with rapidly emptying stomachs presented blood-sugar curves following the ingestion of 50 g. of glucose, which deviated from the generally accepted normal. In 10 cases the blood-sugar concentration, after suddenly attaining a hyperglycæmic peak returned promptly to the normal fasting level within two hours. In the other 10 instances there was not such an abrupt rise of the blood-sugar curve, and there was also some delay in its return to the normal. Circumstantial evidence points to the rapid and excessive absorption of sugar from the intestine, due to the hasty emptying of the stomach, as a factor in the causation of the so-called "lag" type of blood-sugar curve. The possible significance of this anomaly with relation to diabetes mellitus is discussed.

The author wishes to express his gratitude to the members of the Staff of the Radiological Department of the Victoria Hospital, London, Ont., for their co-operation during the conduct of this investigation.

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FIBRIN CALCULI*

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THE rarity of reported cases of albumin or fibrin calculi of the urinary tract warrants the recording of a case observed in St. John's Hospital, Brooklyn.

A.A., Italian housewife, aged 38, was admitted on February 22, 1934.

Complaint.—Pain in the right loin with difficulty in urination.

Family history.—Irrelevant.

Present illness.—This began in 1928, when the patient first began to have pain in the right loin with attacks of fever, chills, and vomiting, and profuse perspiration. The pain was sharp, stabbing and localized. Attacks occurred infrequently, on an average of twice a year, until three years before admission, when they became more frequent. For the last year the attacks had been occurring every two weeks and with increasing severity as to the pain. On February 13, 1934, the patient had an unusually severe attack and noticed for the first time a radiation of the pain down the right lower abdomen to the labia majora. Following subsidence of the pain she noticed burning on urination as well as a white sediment in the urine.

Past history.—There was a history of acute articular rheumatism following tonsillitis, lasting for three weeks in 1924. The urine at this time showed only a trace of albumin. She was admitted to hospital in 1930 for three weeks during the attack of pain described. Menstrual and marital history were normal. In 1922 she had had nephropexy performed on the right kidney. The complaint at this time was constant dragging pain in right loin.

Physical examination.—Physical examination showed a well developed and nourished white woman of stated age, not acutely ill, showing normal eyes, ears and nose, but with badly carious teeth, many of which had been extracted. The tonsils were normal in appearance. The heart and lungs were normal; blood pressure, 120/70. Abdominal examination:—A mass thought to be the right kidney was palpable. The impression after physical examination was right pyonephrosis with renal calculus, associated with dental caries.

Laboratory data.—On admission a catheter specimen of urine showed a specific gravity of 1.008, with an alkaline reaction; albumin 1 plus, and, microscopically, a large amount of pus. Ureteral catheterization at this time showed 2 plus albumin on the right side, 1 plus on the left, with the presence of a large number of white blood cells and many red blood cells on the right and red blood cells on the left. The urea estimation (Dupré's modification of the hypobromide method) showed 0.11 per cent right, and 0.64 per cent left. At the time of cystoscopic examination very foul urine was withdrawn from the bladder, the base and trigone of which showed chronic inflammatory change. The urine passing down the right catheter was noticed to have a foul odour. On intravenous injection of dye, excretion was noted on the left side in three minutes; at the end of twenty minutes only a mere semblance of colour developed in the urine from the right ureter. The

culture of the urine from the left ureter was sterile; that of the right ureter showed abundant growth of *B. coli*. The cystoscopic diagnosis was "Calculi in the right kidney, with advanced pyonephrosis and hypofunction of the right kidney". A flat x-ray plate taken at this time showed a right pyonephrosis with stone, with moderate hydronephrosis on the left side and the presence of a large "tumour" shadow replacing the right kidney. The blood count on admission showed 71 per cent hæmoglobin, with 10,000 white blood cells (64 per cent polymorphonuclears, 34 per cent lymphocytes, and 2 per cent monocytes).

The temperature, pulse and respirations on admission were normal. Following cystoscopic investigation it was



Fig. 1.—Cyst of the kidney containing a fibrin calculus.

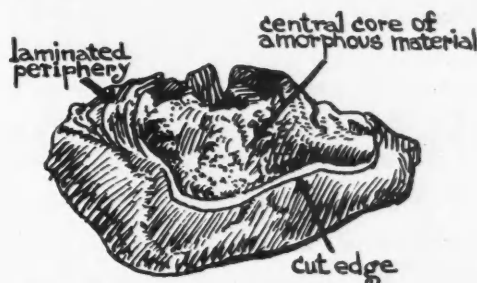


Fig. 2.—Stone sectioned to show contents.

decided to do a right-sided nephrectomy. The kidney was accordingly removed, and the patient, aside from a slight post-operative rise of temperature, had an uneventful convalescence, being discharged from the hospital on March 18, twenty-four days after admission. On further examination after discharge it was found that at the time of operation the patient was three months pregnant, and that the menstrual history she gave was intentionally misleading.

Pathological report.—"The gross specimen consists of kidney structure measuring 7 by 4 by 2.5 cm., being the flattened, collapsed remains of a cystic mass. On section, the kidney tissue is found to be replaced by multilocular cavities which represent for the most part the dilated and cystic calyces of the organ. Many of

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these cystic cavities contain faceted stones. The grossly evident kidney tissue is compressed, having indistinct tissue markings and showing central areas of hæmorrhage. Accompanying the kidney are many faceted stones of varying size. In general they have a flattened pyramidal shape. The surfaces vary from a greyish brown to a dark red in colour, being for the most part smooth. The larger stones measure approximately 2 by 1.5 by 1 cm. On palpation the larger of the stones have a distinctly rubbery elastic feel. Firm pressure causes fragmenting of the outer surface, which is seen to exhibit a laminated appearance on section. In the larger stones this laminar layer measures from 2 to 3 mm. in thickness. Internal to this laminar layer the contents of the stones are found to consist of a putty-like amorphous material, having a dirty greyish white appearance (Figs. 1 and 2).

"Microscopic examination of sections of the kidney shows areas in which the secreting structure is relatively well preserved, there being evidence of glomerular congestion and moderate to marked cloudy swelling of the tubules. The arterioles in this region show mild intimal thickening. Sections from areas contiguous to the locules grossly described above show the presence of an inflammatory exudate in the interstitial tissue, composed chiefly of histiocytes and plasma cells, but containing fewer polymorphonuclears. The walls themselves of the cystic cavities consist of oedematous necrotic parenchymal structure infiltrated with an inflammatory exudate in which more polymorphonuclear leucocytes are in evidence. Some of the collecting tubules contain pus casts. Several areas show hæmorrhagic extravasation into the interstitial tissue.

"Sections of the calculi stained with hæmatoxylin and eosin show a completely acellular structure. The peripheral portions show a laminar arrangement in which there are areas of red acidophilic amorphous structure alternating with blue granular material. The blue areas are arranged as continuous 'rings' running for some distance around the stone. The acidophilic amorphous material is more openly placed, extending circumferentially for a short distance and then dipping suddenly in a radial fashion toward the centre, producing an irregular zigzag outline. With the Gram stain numerous Gram-positive cocci arranged in clusters are seen throughout the stone but are more numerous toward the outer surfaces. An occasional Gram-negative bacillus is seen. With the Gram-Weigert stain for fibrin many of these zigzag areas give a positive reaction for fibrin. Sections stained for mucin by Mayer's mucicarmine method give a negative reaction for mucin. Chemical examination of the stone shows the presence of fibrin, calcium carbonate, and phosphates. The pathological diagnosis was 'Fibrin calculi, with pyonephrosis and chronic suppurative nephritis'."

DISCUSSION

This case seems worthy of record because of the relative infrequency of the description of the condition in the literature. In 1928 Hyman¹ summarized the literature of 22 cases on record up to this time and added 3 cases of his own. In the same year Hamar² reported 1 case of fibrin stone. In 1930 Pedroso³ reported 1 case in which the stones were associated with the finding of tubercle bacilli in the urine and in the stones themselves. In this case he observed an unusual pyelographic finding and claimed that it had diagnostic significance. In 1932 Scholl⁴ reported 2 cases of bacterial calculi in

the kidney pelvis, the description of which would seem to warrant their inclusion under the heading of fibrin calculi. In 1932 Moore⁵ reported 2 cases. These with our present case comprise a total of 32.

The gross descriptions of the stones, as reported in the various articles, are in many respects similar, as most of the observers have found the presence of amorphous material associated with bacteria, either in the layers of the stone or in the nucleus of the stones themselves. The gross descriptions all agree on the fact that these stones are of a "soft" variety. In this connection it is interesting to note that in Hyman's report, two of the three cases showed recurrence of stones in the bladder, the recurrent stones having the same general features as those observed in the first instance. That such stones however might become impregnated with an inorganic material and be converted into the hard variety is evident from the summary of his third case, in which, following upon two recurrences of the "soft" stone variety, a third recurrence was attended by a typical hard phosphatic vesical calculus.

It has been observed that there is a great range of variation in the chemical composition of these stones. Thus, in Schmorl's⁶ case no urinary salts whatever were present in any of the sixty concretions he described. Lauda,⁷ on the other hand, found calcium salts present in his case. Peiper⁸ described the presence of uric acid. Morawitz and Adrian,⁹ besides finding bacteria and albumin, were able to demonstrate calcium phosphate in the nucleus of the stone. Meyanchi¹⁰ notes the presence of "urinary salts" in his case, but does not state what these salts were. Von Lichtenberg¹¹ demonstrated a small amount of calcium phosphate in his case, as also did Meyer and Herzog.¹² Pedroso, in his chemical analysis of the stone in his case, showed the presence of calcium oxalate.

Apart from these variations in the inorganic constituents of these so-called fibrin or bacterial stones there is also a great range of variation as to the organic constituents. Most of the case reports agree as to the frequent finding of albumin in these stones. Many of them were able by suitable staining methods to demonstrate fibrin.^{3, 11, 13, 14} Schmorl, on the other hand, was unable to demonstrate fibrin by the Gram-Weigert reaction in his case. Besides

these substances, cholesterin,³ mucin,¹⁵ and amyloid¹⁶ have also been demonstrated in these soft calculi.

Similarly, cultures of such stones vary in their microorganismal findings. *B. coli*^{4, 13, 14} were positively identified. Tubercle bacilli were found by Pedroso.³ Other workers described the presence of Gram-negative organisms only,⁶ or Gram-negative and Gram-positive organisms occurring together.¹³ Blatt¹³ found *B. pyocyaneus* on culture.

Certain features appear to be common to the development of these fibrin calculi. For example, in almost every instance, and as seen in our case, there has been an associated pyogenic infection of the kidney, either in the form of pyonephrosis or pyelonephritis. In a large percentage of these cases, moreover, *B. coli* was the only or the predominating organism cultured from the infected organ. Significant of this is the finding of Ikoma,¹⁵ who by *in vitro* methods was able to produce structures that resembled fibrin calculi by means of the addition of the products of bacterial metabolism to a fibrin medium. The significance of this finding, when viewed in the light of the etiological development of these stones, is in serious doubt, however, because of the high frequency of pyonephrosis caused by *B. coli* and unattended by the development of fibrin calculi. It would seem then that certain factors other than the presence of colon infection of the renal tract are necessary to explain the development of fibrin calculi. In the light of recent experimental work in which, by means of vitamin-deficient diets, it has been possible to produce experimental calculosis in animals, it would appear reasonable to assume, as Becker¹⁷ and Keyser¹⁸ did, that disturbances in metabolism might play some part in their development.

These varied findings bearing on the bacterial content and the organic and inorganic constituents of these soft calculi point to the fact that their physico-chemical development cannot be explained on any single set of factors, but probably represent the end-result of a number of various influences such as urinary stasis, bacterial infection, tissue predisposition, metabolic disturbances, and the like. In the case of the so-called "fibrin" calculi it is not unlikely that certain mechanical features play a large part in their development. Thus hæmaturia is

described frequently enough in connection with the development of this type of stone to warrant the suggestion that these calculi are the direct consequence of renal hæmorrhage. If this be true then it would seem almost necessary to limit the use of the term "fibrin calculus" to those cases only in which there is an antecedent history of hæmaturia or in which examination of the stone by staining methods and otherwise gives positive tests for fibrin. These criteria would be fulfilled in the cases of Pedroso,³ Ward,¹⁹ Gage and Beal,²⁰ and Kelly and Dibble,¹⁴ as well as our own. It would seem better then for purposes of clarity to describe non-fibrin containing calculi simply as "soft" stones. That some confusion exists as to the proper designation of this class of stones is evidenced by the title of Hyman's¹ paper, "Albumen, fibrin, and bacterial stones of the urinary tract".

CONCLUSION

The findings in our case are of definite clinical interest. Thus it has actually been possible, because of the long period in which the patient was observed, to follow the development of a urinary infection leading up to the production of this unusual type of calculus. While unfortunately no cultures of the stones in our case were made, the finding of a pure culture of colon bacillus in the urine and the evidence of bacteria in the stained sections of the stone would seem to be sufficiently strong evidence for presupposing some sequential relationship between the antecedent bacterial infection and the development of the calculi. The rare occurrence of this type of stone in cases in which a chronic colon infection of the tract develops in association with attacks of hæmaturia is worthy of note. We suspect, moreover, that this type of calculus formation is far more frequent than the reports in the literature would indicate. Another interesting feature of our case is the association of the calculus with pregnancy, and the fortuitous circumstances leading to the continuation of the pregnancy, despite the operative intervention. It might be interesting to speculate on the possible relationship that the pregnancy bore to the development of the stones. Thus it is a well known fact that during pregnancy urinary stasis increases, and if there be a pre-existing pyonephrosis it is not unlikely

that the added pressure on the ureters and bladder during gestation would tend to increase the intrapelvic pressure, with consequent lessening of drainage and possible predisposition to the development of small hæmorrhages from the pelvic mucosa. This speculation is supported by the evidence of blood in both ureteral samples. The x-ray findings in this case would lend support to Pedroso's contention that there is a characteristic change in the density of the pelvic shadow in the course of a pyelogram when such calculi are present. The mottled appearance that he describes as of diagnostic importance was present even in the flat plate taken of the kidney region of this patient. Unfortunately no pyelogram was taken of this involved side but it seems likely that the mottling would have been accentuated in the presence of opaque solution.

SUMMARY

1. A case of fibrin calculus is reported, showing urinary symptoms for twelve years, with the subsequent development of a pyonephrosis, hæmaturia, renal colic, and with the removal at operation of fibrin calculi at a time when the patient was pregnant.

2. The composition of this type of stone is discussed.

3. There appear to be certain pyelographic findings that if not sufficiently diagnostic of this type of calculus at least raise the question of its existence.

4. There seems justification for limiting the use of the term "fibrin calculus" to a description of cases in which hæmaturia is a presenting

symptom and in which fibrin can be detected by suitable methods in the substance of the stone.

5. It is felt that for fibrin calculi to develop a previous chronic suppurative renal lesion must exist, which, when associated with hæmaturia, provides the necessary bacterial and chemical constituents for the development of this type of stone.

6. It is the impression of the authors that this condition is more frequent than reports in the literature would indicate.

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EXPERIMENTAL PRODUCTION AND PREVENTION OF APPENDICITIS WITH HISTAMINE*

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IT has been shown that the intraperitoneal administration of a locally irritating solution such as formaldehyde will cause localized appendicular lesions in the rat. Since these lesions are invariably observed in the appendix, or rather in that part of the cæcum of the rat which corresponds to the appendix of man, and since the lesions develop from the mucosa out-

ward and not from the serosa inward, it has been concluded that these lesions cannot be attributed merely to the local action of the irritant.¹ For reasons stated in previous communications^{2 to 6} it has been concluded that any non-specific stimulus which seriously damages the organism will elicit a typical reaction, which has been termed the "alarm-reaction", and it is very probable that at least some of the symptoms of this reaction are due to the liberation

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of histamine or physiologically related compounds from various tissues of the body. Since it is not the object of this communication to discuss the "alarm-reaction" as such, the reader who is interested in its symptomatology is referred to the papers referred to above.

From the point of view of the pathogenesis of appendicitis it seemed of interest, however, to correlate the findings with the histamine theory of the alarm-reaction, since it appeared possible that the appendicular lesions might be a characteristic symptom of a particularly acute non-specific damage, such as would be caused by the intraperitoneal injection of formaldehyde. In order to verify this assumption, 30 mg. of histamine were administered intravenously to hooded black and white adult rats, and it was observed that such treatment is invariably followed by symptoms of acute appendicitis; at autopsy, seven hours after the injection, an extremely acute hæmorrhagic phlegmonous appendicitis was found. Although there is no evidence at this time that acute appendicitis in man is produced by a similar mechanism, these experiments seemed of interest inasmuch as they gave conclusive evidence that the intravenous injection of histamine, a physiological body constituent, may cause localized lesions in the appendix.

In animals in which a less acute alarm-reaction was produced, for instance, in animals receiving subcutaneous injections of formaldehyde or other damaging substances, many other anatomical changes were observed, but no appendicitis. It was concluded, therefore, that probably the appendix would not react unless the damage was very sudden and severe. It is interesting in this connection that while more gradually exhausting muscular exercise will cause a characteristic alarm-reaction of the less acute type in the rat, but no appendicitis, typical appendicular lesions may result if the animal is forced to exhaust itself very rapidly.

In view of the frequent combination of clinical symptoms of pleuritis with appendicitis, it was interesting to see whether intense irritation of the pleura might not also be the cause of appendicitis. Six adult hooded rats received injections of 0.25 c.c. of a 4 per cent formaldehyde solution into the left pleura. They were sacrificed twelve hours later, and at this time three of them showed anatomical signs of acute

appendicitis. In view of these findings, it appears quite possible that pleural irritation may actually be the cause of appendicular lesions, at least in the rat.

Since appendicitis was not observed in less acute cases of general damage, that is to say, in the more typical form of the alarm-reaction, the question arose whether histamine might not exert its effect on the appendix as a gradient-potential poison (*Potenzialgift*). It is conceivable that the effect on the appendix is not due to the actual concentration of histamine in the body at any particular time but to the rate at which the histamine concentration increases. If this assumption be correct it would be easy to understand why appendicitis is not seen in a more chronic alarm-reaction, even though other symptoms are extremely marked. It should be possible, furthermore, to prevent experimental appendicitis by pre-treatment with small doses of histamine or by the production of a less acute alarm-reaction before the administration of a dose of histamine which would otherwise cause appendicular lesions. As will be seen, this assumption was confirmed by the following experiments.

Thirty-two adult male black and white rats of the hooded variety were divided into four groups of eight. The first group received 20 mg. of histamine subcutaneously twice within 24 hours. The second group was forced to run in revolving cages for periods of 10, 40 and 45 minutes, with three-hour resting periods in between. The cages revolved at a rate of 18 revolutions per minute and their diameter was 12 inches. The third group received 0.5 c.c. of a 4 per cent formaldehyde solution subcutaneously twice during 24 hours. In all these groups, the pre-treatment sufficed to cause a certain amount of general damage, as judged by the condition of the animal. The fourth group was not pre-treated. Fifteen hours after the pre-treatment was finished all these rats received an intravenous injection of 30 mg. of histamine hydrochloride intravenously. They were autopsied 7 hours later, when all the animals in the non-pre-treated group showed marked œdema of the appendix with hæmorrhages and round-cell infiltration. The histamine-pre-treated group and the group exposed to muscular exercise showed no change in the appendix. The formaldehyde pre-treated group showed superficial erosions in the mucosa of the appendix in some cases, but even in this group reaction was never so marked as it was in the non-pre-treated animals. It appears, therefore, that the experimental appendicitis caused by histamine may be prevented by pre-treatment with small doses of this drug and completely, or at least partially, inhibited by other agents which cause an alarm-reaction.

Since so many damaging stimuli may prevent the formation of appendicitis following histamine injection it is not very surprising that the reaction is not very consistently obtained in

animals other than the hooded rat. Thus it was found much more difficult to produce appendicitis by this means in the albino rat or the rabbit, although certain degenerative changes in the lymphatic tissue of the appendix do occur in many cases.

This paper should not be concluded without emphasizing the fact that as yet nothing is known about the actual mechanism by which histamine selectively damages the appendix or by which this effect is inhibited. Oertel⁷ has recently expressed the view, based on a study of the literature, that the symptoms of the alarm-reaction, and more particularly the appendicular lesions, may be due to neurovascular reactions. While this is quite possible, further experimental work will be necessary before such an explanation can be considered to be definitely proved.

SUMMARY

Intravenous injections of histamine, a physiological constituent of the body, cause acute phlegmonous appendicitis in the rat, and this may be prevented by pre-treatment with smaller doses of the same substance. Other acute damaging stimuli may also cause similar lesions, and here again pre-treatment with smaller doses of the same damaging agent acts as a prophylactic measure.

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SOME ASPECTS OF MODERN CANCER THERAPY*

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IN order to lay the foundation for a discussion of the treatment of cancer it is well to digress a bit first and to indicate something of the scope of the cancer problem as a whole.

The study of the whole field of neoplasms, benign and malignant, is rapidly coming to occupy the foremost place in medicine. The medical world and the laity are beginning to realize that here is a huge problem, too long treated as a step-child, which now demands our immediate and continued attention. While we speak of this problem as the "cancer problem", we must, for the sake of correct thinking, avoid the error of visualizing it as a question of studying and attempting to control a single disease, like syphilis or tuberculosis. Our foundation is firm only when we accept the view of modern pathology, that we are concerned here not with one disease but with an almost innumerable host of diseases. In fact it may be safely stated that within the scope of neoplastic diseases lie more distinct entities than are embraced within all the rest of the realm of medicine.

Thus a study of the causes of cancers and tumours calls for an inquiry into a bewildering array of multitudinous factors, of hereditary, traumatic, chemical, electro-magnetic, thermal, hormonal, developmental and other influences, which as yet yield only a little light in a few places. Therefore, much may be said but comparatively little is positively known about measures to be taken towards the prevention of malignant tumours. The problem is so large and many-sided that even those whose full time is consumed in this work can have but

imperfect knowledge of what has been and is being done. A universal philosopher is needed to codify the present knowledge of the world in this vast field, fragmentary as it is, in order that we might see more clearly where we stand today.

The diagnosis of cancer has developed into so many ramifications that no one person can any longer be fully competent to bring to bear the best of modern knowledge. When we consider all the special techniques of roentgenography and endoscopic examinations, the familiarity with the diseases of various organs, and the highly specialized knowledge of tumour pathology that must be applied to the problems of diagnosis, we realize that this is neither a one-man job, nor is it properly to be considered merely incidental to general medicine or surgery.

On the foregoing premises, then, we can insist that, even before we approach the question of the treatment of cancers, and thinking only of trying to make a correct diagnosis, and to know something of their causes, and of what to do to lessen their incidence, we have a group problem. To cover fully all the aspects of this group problem we need specially trained pathologists, internists, neurologists, biophysicists, tumour physiologists, chemists, roentgenologists, and surgeons skilled in all the special techniques of examination of various systems. For example the man who can correctly diagnose a case of intrinsic laryngeal cancer in an adult is not

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likely to be identical with the man who can properly assay a case of leukosarcoma in a child.

Now, with this foundation laid, we may come to the question of the treatment of tumours, benign and malignant—literally thousands of different diseases. Is it a problem for the surgeon, or for the radiologist? It is for neither, nor for both, acting alone. Again, it is a group problem for them, fitting themselves by special study and experience, and working in close conjunction with all the other special types of investigators mentioned before. There is no question of competition between methods of treatment: "whether radium and x-rays are better for cancer than surgery", or *vice versa*. No blanket rule can apply. Some tumours are best treated surgically, some best by radiation, many best by a combination of methods. The forlorn figures in the medical world today with respect to the treatment of cancer are two—the hard-shell surgeon who knows little and cares less about the effects of radiation, and, on the other hand, the radiotherapist whose lack of surgical knowledge warps his judgment about how best to treat many of the tumours that come to his hands.

The term "cancer specialist" still tends to carry with it some suggestion of quackery, because in the past as a rule no one but a quack would set himself up as specializing in the treatment of cancer. However, the growth of special institutions and services for the study and treatment of cancer and neoplastic diseases, and the increasing numbers of well trained men graduating from these institutions may soon bring about the general recognition of the practice of the diagnosis and treatment of cancer as a reputable specialty. In general, such specialists would be primarily surgeons, well equipped with radiological knowledge. Such surgeons however, had better not attempt to cover the whole field. There should be room for internists, similarly well equipped with a knowledge of radiology, to care for the numerous non-surgical neoplastic diseases, such as the lymphomas and blood dyscrasias and the medical complications that arise in particular association with tumours.

As we consider in retrospect the evolution of the treatment of various major forms of cancer during the past two decades we realize that we are beginning to witness the emergence of some fairly definite principles to be followed. The contributions of the pathologists and clinicians in delineating the natural course of the diseases; the studies made by the pathologists in the grading of the degrees of malignancy and in predicting radiosensitivity, the work of the biophysicists in revealing some of the secrets of the differential effects of various wave-lengths of radiation, and in computing doses of radiation actually delivered to the tumour rather than what falls on the overlying skin, and the studies of Regaud, Lacassagne and Coutard on the effects of protracted fractionated irradiation have all played an important part in shaping modern methods of radiation therapy. This young branch of medical science has taken tremendous strides during these past two decades.

In the meantime surgery has not stood still. Yet the chief way in which surgery has gone forward in the treatment of cancer has been through the adoption by leading progressive surgeons of the advances in the knowledge of malignant tumours and of the behaviour of tumours in response to radiation, and the incorporation of this new knowledge in their surgical practice. Progressive surgery has thus come to realize and acknowledge some of its limitations. We hear less and less about radical hysterectomy for carcinoma of the cervix, total cystectomy for cancer of the bladder, or radical operation for carcinoma of the penis or for teratoma testis. Few surgeons attempt to handle the lymphomatous diseases by operation.

On the other hand the limitations of radiation therapy are being admitted even by some of its strongest advocates. For example, it is realized that some of the most cellular and actively growing carcinomas of the thyroid are not radiosensitive, as might be supposed, but that experience has shown them to be radioresistant. The results of radiation treatment of osteogenic sarcoma have in general been disappointing. Endothelial myeloma is remarkably radiosensitive, and thus its bulky tumours may rapidly disappear following suitable doses of x-rays or radium, but in a few months the patient may develop metastases causing death. Therefore, whenever feasible, it seems to be a good plan in treating endothelial myeloma to irradiate the tumour thoroughly, yet not to be satisfied with its apparent disappearance, but rather to remove then the segment of bone containing the residue of the tumour. We know that surgery alone offers little hope of curing endothelial myeloma by excision, where such a procedure would be feasible, and only a 10 per cent chance by amputation. In metastatic squamous cancer in lymph nodes of the neck and groin, external radiation can almost never effect complete disappearance of the disease, and in such conditions surgical dissections or surgical exposures, to permit implantation of radon seeds, are called for.

Thus, from these few examples—and many others could be quoted—we see that in the modern treatment of cancer we need to bring to bear both surgical and radiological methods of attack. It is pointless to attempt to find statistics to prove that surgery offers better results than radiation, or *vice versa*. No such figures for truly comparable groups of cases are available. Whenever such figures seem to be available a careful analysis would show that other factors, such as selection of cases, render the statistics valueless for comparison.

TREATMENT

Let us now consider the treatment of some of the major forms of cancer. In this discussion the methods which will be given in a general way are not claimed to be necessarily the best or final methods, but are those which are currently applied at Memorial Hospital. It will be impossible within the limits of this paper to detail the arguments for and against these methods, or to narrate the history of their evolution. They are given as representing what now seems to the workers at Memorial Hospital to be the best practice in view of past experi-

ence, present knowledge, and available facilities.

Carcinoma of the lip.—Superficial lesions up to about 1 cm. in thickness are treated by radiation. This treatment may consist of contact application of beta ray applicators for the most superficial growths, or, for the rest, the use of filtered tubes of radon fixed in moulded dental compound moulages, with or without supplementary irradiation by radon seeds implanted within the growth, depending on the size and depth of the tumour. Treatment by radiation of these superficial lip lesions gives better cosmetic results than the surgical excision.

Larger lesions, that is, those of 2.5 to 3 cm. or more in diameter, and infiltrating to a depth of more than 1 cm. are preferably treated by surgery if cervical node metastases are absent, or if, when present, these offer a possibility of being managed satisfactorily. Such bulky lesions are not best treated by radiation, because the large dose required would lead to extensive breaking down of tissue with a long period of healing, leaving a large tissue defect with an unfavourable bed for any possible subsequent plastic operations.

The question of the management of metastases to the cervical nodes naturally arises here. Proponents of surgical treatment of lip cancer routinely recommend radical neck dissection. Since it is found that of the patients who show on admission no palpable cervical nodes, and whose primary lesions are successfully controlled, about 80 per cent subsequently remain free of metastases to the neck, we see at once that a severe discount must be taken from figures of surgical cures. On the other hand, the mortality of neck dissection when applied as a routine may reach 11 per cent (Kennedy). The trend at Memorial Hospital has been away from the radical neck dissection, replacing it by procedures carrying much less morbidity and mortality, namely, combinations of radiation and limited surgery. Depending on the size and number of nodes, the procedure may be (1) surgical exposure of the nodes and the implantation into them of a dose of radon seeds, calculated very definitely according to measurements of the nodes or volume of tissue to be irradiated; (2) the implantation of a so-called "over-dose" of radon seeds, followed in a few days, that is, after decay of the desired dose, by local excision of the involved nodes or a

limited dissection of the involved area; (3) heavy external irradiation of the metastatic mass, followed by implantation of radon seeds.

What has been said concerning the treatment of lymph-node metastases from lip cancer applies equally to metastases from squamous carcinoma of the mouth, pharynx and larynx, and may be also applied to the metastases of squamous cancer in the groin from growths of the vulva, scrotum and penis. The trend has also been to give up entirely the so-called prophylactic neck irradiation in the absence of demonstrable disease in the neck.

The so-called Coutard method of x-ray treatment, consisting of daily small doses carried on over a period of three to four weeks or longer, permitting the application of a much larger total dose than could be given with larger single or spaced treatments, has shown remarkable results in many types of tumours. Particularly in growths about the anterior floor of the mouth, the base of the tongue, the soft palate, the tonsil, pharynx, and extrinsic larynx, where the tumours commonly are of the more radiosensitive varieties, this type of treatment, carried to the point of producing a severe epidermitis externally and a severe mucositis with a diphtheroid membrane internally, results in a large percentage of complete or nearly complete regressions. We expect to see complete repair of the denuded skin and mucous membrane. If a nubbin of residual tumour is found at the end of a month from the beginning of treatment radon seeds are implanted into it at this time, *i.e.*, during about the height of the reaction that results from the external irradiation. These tumours are seldom amenable to surgical treatment. In employing this heavy external irradiation it is of great importance to ensure accurate direction of the beam of x-rays and to keep the size of the portal as small as possible so as to avoid an excessive and unnecessary body dose of irradiation.

Martin has pointed out a fact in external irradiation which is commonly overlooked, namely, that by using a circular portal we can just as efficiently irradiate most tumours as by using a square or rectangular portal, and at the same time, because of rounding off the corners, we spare the patient the harmful effects of the irradiation of an unnecessary additional 25 per cent of skin surface and tissue volume. We

realize that reducing the size of the surface portal reduces the depth dose and may thus seem to be a disadvantage, but it also diminishes the severity of the skin reaction, and the loss of depth dose can be more than compensated for by the fact that with the small portal the skin will permit giving much more radiation that is accurately centered over the tumour than could be given if a larger field were used.

However, to carry out effectively a plan of external irradiation calling for (1) the use of the smallest possible circular portals, (2) daily treatment, and (3) a dose resulting in severe temporary reaction in skin and mucous membrane or other underlying normal structures, demands close personal supervision of the patient during and following the irradiation program. Accuracy in placement of the beam of x-rays and attention to the patient's comfort during the stage of radiation reaction are essential.

Carcinoma cervicis uteri.—In treating cancer of the cervix of the uterus it is now a well-nigh universal practice to depend exclusively on radiation. This treatment at Memorial Hospital has gone through several stages. At present we prefer in all but the very early cases to give first a cycle of external irradiation about the pelvis. The method of external irradiation is being varied. Probably the best way is by divided doses, giving 200 to 250 roentgen units daily to two of six portals to a total of 2,000 to 2,400 r per portal. At the conclusion of the roentgen treatments the radium application is made, consisting of the so-called bomb placed within the vaginal canal directly against the cervix, giving a dose of 1,000 to 1,500 millicurie hours, filtered through the equivalent of two millimetres of brass, and the intrauterine capsules, giving a dose of 3,000 millicurie hours filtered through 0.5 millimetres of gold. The average percentage of five-year cures of all cases of cancer of the cervix treated by irradiation, regardless of the stage of the disease, is 20 to 22. The Radium Institute in Paris claims a salvage of as high as 35 per cent of all cases. The early cases show a five-year cure rate of 55 to 60 per cent. It is hoped that these figures may be improved by suitable changes in technique.

Carcinoma corporis uteri.—In the treatment of carcinoma of the body of the uterus it is

usually felt that hysterectomy is the main procedure on which to rely. Yet Healy has shown that a considerable proportion of these cases may do very well if treated only by irradiation (both intrauterine and external). It would appear that the more highly malignant types, adenocarcinoma grade III and anaplastic adenocarcinoma grade IV, should either be treated by radiation alone, or at least that the hysterectomy should be preceded by full intrauterine and external irradiation.

Ovarian tumours.—Experience with ovarian tumours has shown the value of combined radiological and surgical attack. There have been several instances of ovarian adenocarcinoma with multiple peritoneal implants and ascites, operated on elsewhere and found to be inoperable, in which x-ray therapy has cleared up the secondary tumours, the fluid has disappeared, and the primary tumour has been so reduced in size as to be readily removable at a second operation.

Epithelioma of the vulva has not been found to lend itself well to radiation. The vulva is so sensitive that radiation reaction is not well tolerated by the patient. It has become the usual practice, therefore, to do a simple vulvectomy as the first step. The groins may be left alone if they contain no palpable diseased nodes. If nodes are palpated in the groin at the time the patient is first seen there is a fair chance that they are enlarged only as a result of infection, and they may not contain cancer. It is considered best to delay groin dissection about six weeks, in order to permit the infection to subside.

Carcinoma of the penis.—For carcinoma of the penis radical amputation and bilateral groin dissection are in the discard. Superficial lesions may be managed by radiation, such as plaques at a radium-skin distance of one cm. Lesions which have penetrated Buck's fascia are believed to be best treated by a conservative amputation 1.5 cm. proximal to the edge of the disease. No local recurrence in the penile stump has been observed at Memorial Hospital following this type of amputation, which commonly preserves a fair amount of the organ. If no inguinal nodes are found enlarged at the first examination metastases are not likely to be found subsequent to treatment of the primary lesion by the conservative measures

described above. If palpably enlarged nodes are found there is a 50 per cent chance that they are only inflammatory. Following treatment or amputation of the primary lesion, several weeks are allowed to elapse in order to permit subsidence of infection in the groin. If the enlarged nodes are proved cancerous by aspiration biopsy a bilateral block dissection is then done. As stated before, external irradiation offers little hope of control of metastases of squamous cancer in the groin. This area will not tolerate the large doses that may be used on the neck. Dean also advises against surgical exposure and implantation of radon seeds in the groin, because complete destruction of the tumour is seldom accomplished and sinuses are likely to form through which the cancer may fungate.

Teratoma testis.—In considering teratoma of the testis, it is interesting to contrast Hinman's report of 100 patients operated on by American surgeons, showing a 5-year salvage of only 17 per cent, with Dean's report of 5-year results in 170 patients in all stages of the disease, including 104 recurrent inoperable and 21 primary operable cases, treated by radiation, in which he shows 29 per cent living and free of disease. For primary tumours he advocates orchidectomy 4 to 6 weeks following thorough irradiation of the testis. The question has been raised, why not simply remove the testicle surgically and rely on radiation for treatment only of the operative field and areas of possible metastases? Dean answers this by showing a notable difference in 5-year results in favour of his procedure, as compared with cases sent to the hospital following simple orchidectomy for primary operable tumours. He also notes the frequency of local recurrence following simple orchidectomy done without pre-operative irradiation. In passing, we may note the assistance of the biological laboratory in this field, in that the Aschheim-Zondek test may be of great help in revealing recurrences before their presence can be known by ordinary methods of examination.

Carcinoma mammæ.—In the treatment of cancer of the breast, radical surgery is the major factor for the average favourable operable case. However, cases that belong in this category constitute only a part of the patients who apply for treatment. Experience has shown that much

worth-while palliation can be given the inoperable cases by radiation. Moreover, we are still committed to the plan of pre-operative irradiation for the operable cases, as we believe it contributes to the chances for cure. Recent studies have shown that the breast lesion itself will be completely sterilized in at least a third of the cases by doses of radiation kept within moderate limits so as not to interfere seriously with subsequent wound healing. In cases that are operable but in which for one reason or another treatment is by radiation alone the results compare not unfavourably with those from radical operation alone.

At present we look with much more favour on a definite program of pre-operative irradiation followed by radical mastectomy than on a plan of radical operation followed by post-operative treatment of a wide area for malignant cells that may not be there anyway. Post-operatively it would seem best not to irradiate unless a recurrence or metastasis appears. The metastases of mammary cancer in bones may show definite palliation following adequate irradiation. Metastases in the liver and lung, however, are not favourable for treatment, as a rule.

Carcinoma of the rectum is regarded as largely a surgical problem. Yet, it can be shown that the use of radiation, externally by pelvic cycles of high voltage x-rays or the four-gram radium pack, interstitially by gold radon seeds, or by contact application within the rectal lumen may contribute greatly to palliation, or even to cure. It is almost routine practice at Memorial Hospital to give pre-operative external irradiation to operable rectal tumours, and in selected cases gold seeds may be implanted as well seven to fourteen days prior to operation. Certain cases, of course, necessitate immediate colostomy. However, it is routinely found that external irradiation in suitable dosage diminishes the amount of infection, lessens mucus, arrests bleeding, frequently decreases the size of the tumour, and appears to improve the condition of the patient both generally and locally.

Carcinoma of the lung is no longer a rare disease. The remarkable technical advances in thoracic surgery in recent years have resulted in a wave of enthusiasm for, first, lobectomy, and, now, total unilateral pneumonectomy. However, unless much earlier diagnoses are

made than is the rule at present only a small proportion of cases of primary cancer of the lung is going to be suitable for surgery. Radiation as yet has but few miracles to offer in this field. A recent study has shown that following the application of the divided dose technique some degree of palliation was obtained in 71 per cent, as against 43 per cent in cases treated by the older methods, and that the figures for marked early palliation increased from only 9 per cent prior to 1933 to 43 per cent subsequent to 1933.

The lymphomatous diseases.—In the treatment of the lymphomatous diseases, the leukæmias, lymphosarcoma, and Hodgkin's disease, better understanding of the clinical course and pathology, based on experience, has led to improvements in technique of irradiation and in

general management, contributing to better palliation. Surgery in these diseases is restricted mainly to obtaining the biopsy and, in rare selected cases, the removal of accessible solitary tumours, for example, certain gastro-intestinal lymphosarcomas, and localized solitary groups of nodes in Hodgkin's disease. Irradiation of the entire body in suitable doses has attracted attention as a valuable adjunct to local irradiation.

In conclusion let me say that the object of this paper is not to furnish details of methods of treatment of cancer, but to indicate in a general way, with some illustrations, the idea that is being more and more widely accepted that cancer is best dealt with as a group problem, not only for the study of its causes and its diagnosis but also for its treatment.

THE DISEASE CALLED "DUODENAL ULCER"*

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THE diagnosis of the average case of duodenal ulcer presents few difficulties, for the patient usually consults a physician when the symptoms of the local lesion are well marked and the course well established. He rarely speaks of indigestion, but of "abdominal pain", "pain or discomfort in the stomach", "a gnawing right here"; for, in his mind, the term "indigestion" is more intimately connected with the meal and associated with pressure, pain, nausea or belching. Though he has difficulty in finding words to express the character of his sensations, the patient is never in doubt as to the time of their occurrence. As a rule, his story of the recent attack is clear-cut. He suffers from distress beginning in the mid-morning and mid-afternoon, quickly increasing and slowly subsiding, and, it may occur also late after the evening meal or may waken him during the night. Day after day it recurs, with the most marked distress after the same meal every day. This spacing is what is meant by the term "timing of duodenal ulcer" and is typical of an ulcer at the usual site in the mid-area of the duodenal caput.

The two features of this timing should be recorded separately because of their significance. The late timing after meals coincides with a certain stage in the emptying of the stomach when the duodenal caput has passed from the stage of continued relaxation before the oncoming food, and is regaining its tonic quality of contraction, while still retaining sharp peristaltic contraction. It is at this stage of emptying of the stomach that symptoms occur one to four hours after the morning and noon meals and three to eight hours after the evening meal. The recurrence of the same proportional distress after the same meal every day continues as long as the routine and habits of life remain unchanged, but, if these should be changed, then this regularity changes.

I have associated with each of these features terms which imply conceptions which may or may not be correct, but which, clinically, have never led me astray. With the late timing I associate the term "irritable duodenal cap", as indicating an over-acting cap, whether this over-action be due to a local or a distant cause. With the same distress after the same meal every day, I associate the term "irritated duodenal cap", as indicating an over-acting cap due to a local cause; that is, the first term sug-

* Read before the Montreal Medico-Chirurgical Society, 1936.

gests the possibility of ulcer; the second term suggests a local lesion, probably ulcer.

Day after day the cycle recurs for periods of days, weeks, or even years, to constitute what is an attack, the limits of which are usually clearly defined. Between the attacks are intervals of days, weeks, months or years. During the earliest intervals the patient is free from local symptoms, or is not bothered by slight symptoms, but, later on, there is an increasing unease in the intervals, until the attacks become mere exacerbations in a continuous course. This periodicity is often seasonal and reminds one of the flares in the course of chronic low-grade infections or in the course of such affections as eczema.

The periodicity of these attacks and the timing may be interfered with and rendered chaotic in course by changes in the routine of life, the habits, the food material or by the use of drugs, tobacco or alcohol. The classical example of the effect of change in habit and routine is the well-known one of the lessening or disappearance of the symptoms of the patient who goes to the woods on a holiday, and, their recurrence a few days after arriving home. Alcohol will cloak the symptoms for years, and the patient who has been persuaded to abstinence may turn on his adviser with "Now, see what you have done". Therefore, when bizarre changes appear in the course of an attack you must inquire into the changes in routine of life, habits, etc.

The local symptoms of duodenal ulcer in the mid-area of the cap can be grouped into two classes. The first group are the ordinary symptoms of a distress, a burning or, as the patient often describes it, "a goneness", "an emptiness", "a sickish, weak feeling", and may go on to an aching, gnawing soreness or pain, often wavy in character, but not colicky. This is frequently accompanied by an exaggerated hunger sensation, yet, a sickish hunger or belching may be the only symptoms. In the early attacks, these symptoms may be so slight and vague that the patient does not mention them, and they can be brought to light only by persistent cross-examination. These are the symptoms due to or associated with an over-acting irritable (or irritated) muscle of the duodenal wall in the middle area of the cap.

The second group of symptoms is associated

with or produced by the acuteness of the inflammatory reaction, with spread of the inflammation to the mesentery as a lymphangitis or peri-lymphangitis to reach the posterior wall, or, a spread of the inflammation by continuity of tissue through the wall, to involve the peritoneum or the adjacent tissues and organs. These symptoms, due to the acuteness of the inflammation and its spread, are continuous, even though exaggerated at times of activity. Localized pain, tenderness in the epigastrium, and rigidity of the over-lying muscle tell the story of invasion of the peritoneum. Pain through to or in the back and its constancy tell of the spread to the retroperitoneal tissues. Spread of the inflammation to the adjacent tissues, the invasion of the gall bladder or the pancreas, also establish constancy of the special symptoms. With the acuteness of the inflammatory reaction, swelling and oedema may be so great as to block the lumen of the duodenum for several inches. If this comes suddenly with pain, nausea and vomiting, the picture simulates the early stages of acute appendicitis.

In this second group, the symptoms are real danger signals, indicating the acuteness of the inflammation, the rapidity of its spread, and the involvement of the peritoneum or other tissues. Keep in mind a clear conception of the pathology when recording the symptoms. A diagnosis of duodenal ulcer is sufficient to cover the first group of symptoms, but, the second group requires additional terms which indicate the threats, so we use "duodenal ulcer with lymphangitis and peri-lymphangitis"; "duodenal ulcer with peritonitis"; "duodenal ulcer with perforation"; "duodenal ulcer with its base beyond the wall and in other tissues". Some of the acute cases may have such a sudden severe onset as to simulate perforation. When such an abdomen is opened there is often a minimal evidence of inflammatory reaction involving the caput and mesentery without external evidence of ulcer, yet, six or seven weeks later radiological examination demonstrates a crater, and seven or more months later a deformity and obstruction may be found.

The site of the first group of symptoms of duodenal ulcer is, in the average case, of no great importance. The site may be the right epigastrium, the retrosternal region, the left costal margin beyond the mid-clavicular line,

the lower left quadrant, or even the lower right quadrant, but, none of these should lead one astray when the timing and periodicity are definite. But, the site of the symptoms associated with the spread of the inflammatory reaction is upper abdominal or in a corresponding area in the back.

The above description of timing and local symptoms only applies where the site is in the mid-area of the duodenal caput, both timing and symptoms being dependent not on the ulcer but upon the particular area of muscle-wall involved. If the site of the ulcer is close to the pylorus, then that muscle is involved and disturbed in action, with the result that the timing is immediate and the pain and distress more severe, varying somewhat with the rate of eating and the amount and character of the food, approaching more closely the bizarre picture of gastric ulcer, and spastic obstruction frequently occurs. Yet, when the history is analyzed, it is not difficult to determine the site of the disturbed action, the likelihood of a local cause and the character of the inflammation.

There are, however, general symptoms which cannot be directly related to a local lesion. The patient often awakens in the morning with a tired sensation, having to force himself to activity. Once he "gets going", he may, under stress of interest and excitement, become hyperactive and pursue his interests in an intense, nervous fashion, with more imagination than concentration. Late in the morning, and always some time in the day, he has spells of fatigue or exhaustion, often transient, and requires all his will power to keep going. He notices himself to be irritable, impatient, often depressed, restless and uneasy, even when no local symptoms are present. It is for these symptoms, and not indigestion, that he occasionally or frequently consults physicians. He shows himself so restless and uneven physically and mentally, so vague in description and detail, and he so often fails to mention or emphasize the local symptoms that the physician tells him "You are working too hard. You should get away on a holiday, etc."

Even when the local symptoms are well described, they may be overlooked because of the nervous, worried patient pouring forth a chaotic tale of vague and inconsistent general symp-

toms, and the physician is led to ask the foolish question "Are your symptoms worse when you are worried or under nervous tension", as if he desired to give special significance to a general law and then take refuge from this annoying and puzzling patient behind the "stone wall" terms of "neurasthenia" and "nervous indigestion". Cling to the facts. This man comes seeking help; he is not normal, for ordinary physical and mental rest establish no reserve; he may not have an understandable story, but, somewhere there is a clue, such as the timing and periodicity of the local symptoms of duodenal ulcer. These are the patients who have had duodenal ulcer from childhood or the 'teens, before growth and stamina were fully established. Some may show the pallor of small repeated hæmorrhages. Some have pigmentary skin changes as occasionally seen in cases of tuberculosis, and, a few in the acute phase show the breakdown of resistance by the occurrence of styes, boils, etc.

The treatment of this disease called "duodenal ulcer" has taken on a very definite form. Like all other forms of treatment that have become clear-cut, it reveals the conclusions and beliefs of the physicians and surgeons as to the essential nature of the disease and the probable cause. These beliefs may be tentative and unexpressed, and often are but vaguely realized.

The *acute cases* are treated as are all cases of acute inflammation—rest mentally, bodily and locally is enforced, and where the symptoms and signs indicate spread to the peritoneum a surgeon should be in attendance. The *hæmorrhage cases* are usually due to acute mucous membrane ulcers, frequently multiple. Some are due to erosions of vessels in the base of an old ulcer. Here, again, the surgeon should be in consultation, and the hæmorrhage is treated as any hæmorrhage, such as pulmonary hæmorrhage, would be treated, and the case as an acute one. The *perforation cases* are surgical emergencies. The *acute cases with obstruction* due to inflammatory œdema and spasm do not require surgical interference, but, all cases with chronic obstruction require operation, not for the ulcer but for the mechanical defect produced by scarring. *All cases where chronic perforation* has established the ulcer base beyond the wall, and *all cases having other lesions in the abdomen*, such

as cholecystitis, appendicitis, etc., require laparotomy.

A few patients with duodenal ulcer cannot or will not conform by reason of their mental make-up or circumstances of life. For these, surgery holds out a definite hope of relief and of increased efficiency, and, once operated upon, the patient is more amenable to control. The average case and all of the above cases after operation require treatment for the disease. The operative cases can be easily controlled, but the patient with mild, moderate or severe local symptoms which have been quickly relieved, needs much convincing before he will consent to the necessary restrictions, operations, and reformation of habits and routine of life. Therefore, the physician, not being in the dread position of the surgeon, must provide proof for his clinical beliefs. Radiological examination, when positive, gives graphic and convincing proof. The string test with weighted silk thread is a good substitute and less expensive, and should be used if the radiological report is negative. The examination of the faeces for occult blood may be tried for six to ten successive days, but has fallen into disuse.

The therapeutic tests are less impressive to the patient, and may not be very convincing to the physician, but should always be used for the information that is obtained. The bowel should be completely emptied by the use of castor oil and then regulated by mild salines. If the symptoms cease and do not return during this period of regulation look to your history, for the diagnosis is probably wrong. The administration of sedatives and alkalies in the form of a mixture containing codeia, bromides and mixed alkalies should in small amounts lessen the distress without interfering with the timing of the greatest distress after the same meal every day, while larger doses should abolish the symptoms, even though the routine of life is unaltered. On stopping the medication for a few days, the symptoms should return with the same interval after meals and the same distress after the same meal every day. Once convinced that the diagnosis of duodenal ulcer is correct, you must proceed to lay down in written form the whole scheme of treatment.

The modern outline of treatment, with due credit to Sippy, has been established not by the physician but by the surgeon, who, having

operated, found himself forced to carry on as a physician, as most of his medical colleagues could or would not enforce what he, out of his experience, believed necessary. He had come to realize that the disease was more than the ulcer for which laparotomy had been done.

The treatment involves as close a supervision of the patient's habits, routine and environment as in the cases of pulmonary tuberculosis, for a period of one and a half to two years. The principles of the treatment are the same. The patient is not removed from all activities, yet, the control is as inflexible. The whole routine of life comes under review, every seeming fault corrected, no excesses permitted, tobacco and alcohol are forbidden, septic foci are cleared or removed and body faults corrected if possible.

For a time, the variety of food is restricted by cutting out all articles that might be related to existing or suspected hypersensitivity, especially all raw fruits, raw vegetables, raw egg, etc. Besides the three regular meals in the day nourishment is also given one and a half hours after the first two meals and at bedtime. The bowel is regulated until firm, normal stools are discharged with a definite feeling of satisfaction. Frequent rest and frequent short exercise are enforced. Alkalies and sedatives, while used at first for relief of the distressing local symptoms, are not to be considered as absolutely necessary as a routine, but should be kept on hand, to be used if there is a recurrence of the slightest unease. The control of the patient so affects the household in which he lives that other members of it should be impressed with the necessity of helping him to conform to the established routine.

It is evident that such methods of dealing with acute and chronic cases reveal an underlying belief in a generalized disease, acute or gradual in onset, often prolonged in course, probably infective, having for one of its manifestations a local inflammatory lesion—duodenal ulcer—and imply the possible occurrence of other local lesions, (as in the bowel, appendix, gall bladder, etc.). The exact type of the suspected infective agent being unknown and empiricism having revealed no specific treatment, the whole plan of treatment is based upon an attempt to change the patient and his chemical processes. The routine of life and body habits that exists evidently allows of the contin-

uance and recurrence of the disease, therefore must be profoundly changed. In fact, a good clinical guide is that no permanent cure of a chronic case is likely to be established without a change in the appearance of the individual.

Up to a few years ago there were few who had any faith that removal of the focus of infection was a specific treatment, though many advised removal in the hope of improving the general health. Yet, many of us knew of patients with chronic duodenal ulcer who were subjected to laparotomies, the ulcer demonstrated but left untouched because a chronic suppurating appendix was found and removed. Following this, there was rapid recovery and the improvement was so great that the patient objected to reporting, claiming that he was perfectly well. He looked well and did not tire, and the routine control was given up. Many of these seem to have maintained their appearance of robust health and had no recurrence of symptoms.

Besides this type, there were some with acute ulcer and inflammatory symptoms, with outbreak of styes, etc., who had almost immediate improvement without recurrence following the removal of a septic tooth or a tonsil containing a well-marked abscess. While searching my histories, I found a number of persons who, though under constant control, had never obtained complete relief until they consented to the removal of a focus. The regular control was continued, and in each case permanent cure established.

Discussion of certain aspects of duodenal ulcer was for a long time carried on so constantly, with such violence, and with so little apparent progress that we lost interest, and, in the consequent lethargy, had time to realize that discussion without fundamental knowledge of the disease is useless. The fundamental requirement before a disease can be intelligently investigated is the acquirement of knowledge and records of the course of the disease in all its phases and variations. Duodenal ulcer is so common and so alters the course of many lives, crippling many and killing more than a few, that every one of us has the opportunity and the obligation to take part in the delineation of the disease by obtaining complete records of each individual case from which an analysis can be made, to more clearly reveal the nature

of the disease. These records cannot be obtained in any material number by observing and recording what happens to the individual from infancy to old age. In place of observation we have to substitute a detailed inquiry into the past history of the diagnosed case, trying to determine whether there is continuity or relationship of the present condition with events in the past. The ordinary methods of history-taking are not likely to yield many clues, and must be supplemented by direct, leading and presumptive questioning of the patient and the patient's relatives. A searching cross-examination must be carried on into any avenue that opens. At best, this is a time-consuming method which only practice, experience and patience will shorten and render orderly. You may object to a method that depends upon leading questions, but, memory of events long past is poor and must be stirred by any means available. Even the presumptive questioning, such as, "When was your goitre first noticed?" "For how many years have you been troubled with that gone, empty, trembly feeling in your stomach?" "How old were you when your sick headaches commenced?" are necessary, for it takes much patience and skill to uncover what the patient believes is unimportant, or what he thinks must be ignored, or what he wants to hide.

The inquiry into the medical history of childhood and adolescence seeks to uncover all those minor ailments which keep recurring or mark a change in general health. It is of more importance to record and analyze the stomach aches, the vomiting spells, the bilious attacks, the anæmia, the run-down periods, the sick headaches, etc., than to record the various immunity-conferring diseases. The latter, when unaccompanied by complications or sequelæ leave little or no scar and no profound change as a whole. However, the complications and sequelæ of such diseases should be recorded, for they may give rise to a continuing infection and a continuing damage.

Among my histories, I have found 257 of duodenal ulcer recorded with sufficient detail for investigation and analysis. Here may I draw your attention to an astonishing fact. Many, probably most, of the original history notes of cases of confirmed or proved diagnosis, when compared with a letter to another physi-

cian describing the case, are found not to contain the essential facts of clinical history upon which the diagnosis was based but these do appear in detail in the letter. I do not claim that these 257 histories are a true sampling of duodenal ulcer cases, for they are not successive and are histories from the office of a consulting physician. Yet, I believe they illustrate certain truths.

The first feature of the analysis is the great length of time that the cases may go before diagnosis is established. The average duration between estimated onset and final diagnosis is 12.7 years. The diagnosis was arrived at:

During the 1st year	27 cases
1st to 5th year	78 "
5th to 10th "	49 "
10th to 15th "	23 "
15th to 20th "	23 "
20th to 30th "	26 "
30th to 40th "	19 "
40th to 50th "	12 "

This long delay in arriving at a diagnosis is apparently due to two main factors. *First*, the patient did not mention abdominal unease of the duodenal type for an average of 6.4 years after the onset. There were 40 who did not, until after the 15th year or longer, volunteer information about the significant local symptoms, though they had frequently consulted physicians as to their general health and other conditions. Twenty-eight patients did consult a physician within the first four weeks, and described the characteristic features during the first visit. *Second*, the physicians either did not elicit the characteristic timing, periodicity and symptoms, or failed to appreciate their significance, owing to the nervous recital of so many varied general symptoms, or were led astray by a negative report from the radiologist.

Before the diagnosis was finally established, the diagnoses mentioned were chronic appendicitis, gall-bladder disease, neurasthenia, nervous indigestion, dementia præcox, or the case might be dismissed with "All your family are of nervous temperament—you must take care of yourself". For the diagnosis of "neurasthenia" there can be no excuse. If you are ever tempted to use it as a diagnosis, attach and underline the phrase "of unknown origin". It is better to admit ignorance and leave the way open than display an ignorance that refuses all enlightenment. For the diagnosis of "nervous indigestion" there may be some excuse, but most

physicians have experienced the results of anxiety and dread, and should realize that there is only a superficial resemblance to the clear-cut timing and periodicity of duodenal ulcer.

The physician was led astray, for a time, at least, by the radiologist giving a negative report on the first examination in 49 cases. After intervals from one month to ten years, the 2nd, 3rd, 4th, 5th, or 6th examination was reported as positive in 47 cases. One was operated upon for perforation. One had hæmorrhage, and an autopsy showed two active ulcers and many scars in the mucous membrane of the caput. The most striking instance of how difficult it may be for the radiologist to demonstrate such a lesion was a man with a history of duodenal ulcer for seven years; then in 1919, 1921, 1922, 1923 and 1925 examinations revealed no evidence, but, in 1927 the report read "Marked deformity of the cap; a pouch present; obstruction 60 per cent in 6 hours".

This 19 per cent of negatives on the first examination is, I believe, nearer the truth than the 4 per cent given by radiologists ten years ago, and will increase as more early cases come for examination. Of these 49 cases reported as negative on the first examination, 23 were positive to the string test.

The age of onset I have arbitrarily set as the time of the earliest evidence of abdominal unease that seemed to be in continuity with the main course.

Before the age of ten years	18
10 to 20 years	43
20 to 25 "	56
25 to 30 "	37
30 to 35 "	26
35 to 40 "	28
40 to 45 "	20
45 to 50 "	9
50 to 55 "	9
55 to 60 "	6
After the age of 60 years	5

The statements made as to the early symptoms indicate a variety of onsets. (1) Acute cases with abdominal pain, often severe, in the upper abdomen, with nausea and vomiting, gradually lessening but lasting for several days. (2) An insidious onset—a "picky" appetite, the patient often ready to come to meals, but interest is lost after a few mouthfuls. This continues for weeks and months, and recurs without apparent reason. The patient may have pain. During the attacks, he appears pale and drawn; usually very active between attacks,

and is at his best when holidaying in the country. (3) A definite onset—he had been a healthy child or boy until he had an acute illness such as tonsillitis, quinsy, alveolar abscess, typhoid, or an acute appendicitis. He was always troubled with his stomach after this.

The 61 cases with onset before the age of 20 provide the greater number of the 40 cases which lasted 15 years or more before the diagnosis was established. Sixty cases of the 257 began acutely. Of these, 22 were below the age of 20, and the rest were fairly distributed through the decades to the age of 72.

The most common conditions associated with the disease called duodenal ulcer were:

	Percentage
Gall stones	in 12, more than 4.6
Appendicitis	" 29, more than 11
Goitre-hypothyroid	" 20
Goitre-hypothyroid with migraine	" 2
Migraine	" 18
Renal calculus	" 3

The above conditions were disclosed by routine history-taking and examination, and were producing symptoms. They were not accidental findings made during special examinations. Of the 257 cases, 42 patients had had tonsils and dead teeth removed for local disease or general ill-health before the diagnosis of duodenal ulcer was established. Of the 215 remaining, 188 had definite septic foci at the time of my first examination.

If the adopted method of inquiry is correct there is a shift of onset to a much younger age than has been accepted in the past. I had anticipated a much greater shift, for, in my records of chronic gall-bladder disease 67 per cent had recurring typical bilious attacks during childhood and adolescence, while 96 per cent of the girls suffering from recurring bilious attacks developed typical gall-bladder disease later in

life. In cases of appendicitis about 20 per cent gave a history of recurring vomiting spells in childhood, but, over against this low percentage are the records of children suffering from recurring vomiting spells characterized by short duration and the vomiting of the last meal as 94 per cent of such cases developed frank attacks of appendicitis. In the childhood histories of duodenal ulcer patients there is no such clear-cut clinical entity. The most common condition is vaguely described as a gradual change in general health, a "picky" appetite, a "weak" or "uncertain" stomach and undernourishment.

There is no evidence that any recognizable type is liable to this disease, but when the disease continues and recurs one gains the impression that the person is abnormal out of proportion to a local lesion and that many may present profound changes.

In using the phrase "the disease called duodenal ulcer" I wish to direct attention to those features of the disease other than the local lesion and to present for consideration the following points: (1) that the disease is more than a local lesion; (2) that there may be many who have the early phases with complete recovery; (3) that the typical recurring or chronic type occurs only in abnormal persons; (4) that the abnormality is associated with a breakdown of the resisting mechanism; (5) that there is a causal or co-existent infection of a low-grade organism, persistent only because of an abnormal host.

The causes of ulceration anywhere in the body are well known. There is no reason why ulcer in the duodenum or stomach should not conform. It should have the same causes and the same frequency. We know that, experimentally, ulcers can be produced by many different methods, but we do not know of the disease called duodenal ulcer being so produced.

HODGKIN'S DISEASE.—V. Schilling reviews the history and etiology of lymphogranulomatosis and the Gordon experiment. Gordon and his collaborators have supplied tangible proofs of the infective theory of lymphogranulomatosis. The virus, however, could not be definitely identified, although Gordon himself is believed to have observed the virus in the ultrafiltrate in the form of minute round granules. The Gordon experiment

consists in the injection of fresh macerated lymphogranulomatous tissue into the brain of a guinea-pig or rabbit. In positive cases the injection is followed by a severe nervous affection of the spastic or paralytic type. Experiments by other workers have confirmed to a great extent the Gordon theory, but so far no absolute proof of the validity of the theory has been obtained.—*Med. Welt*, February 6, 1937, p. 167. Abs. in *Brit. M. J.*

THORACOPLASTY IN THE TREATMENT OF PULMONARY TUBERCULOSIS*

(WITH REPORT OF 100 CASES)

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THIS review will add little original material to the voluminous literature on the subject of thoracoplasty. However, we wish to emphasize the importance of this procedure as a measure applicable to an increasing number of patients. The surgical treatment of pulmonary tuberculosis has taken on an importance that few dreamed of a few years ago. The consideration of surgical methods should enter the picture as soon as treatment begins.

The more general adoption of surgical procedures has meant that during the last few years every sanatorium and every organization for the treatment of tuberculosis should make adequate provision for surgical collapse therapy. The sanatorium of today either must have adequate surgical equipment and staff competent to do this work or be closely affiliated with some institution that has. This development has meant a complete reversal in the relative efficiency of various institutions. It is not twenty-five years since sanatoria were built, equipped and staffed, with the sole purpose of providing isolation and a regimen of rest, diet and fresh air. Patients able to carry out this treatment in dry, sunny, high altitudes were thought to be the only ones with a real chance of recovery. Consequently there is little wonder that it is difficult, even yet, to picture surgery in the forefront of the treatment of pulmonary tuberculosis.

SELECTION OF CASES

The aim of thoracoplasty has been to close moderate-sized and large cavities that have persisted after more or less prolonged rest treatment. The 100 cases here reported comprise the total number undertaken at the Saint John Tuberculosis Hospital between January, 1924, and December, 1935. We have been conservative in so far as to operate on only chronic

cases; yet in our series there is a fair proportion of "slipping cases" and "bad chronics" as well as "good chronics". Until recently we have tried to operate only in cases of unilateral disease, but the majority at some previous time have had an active lesion on the better side. We have grouped our operative risks as A, B, and C, according to what we considered good, fair, or bad, somewhat after the method of Brunner¹ and Archibald,² but realizing, as has recently been pointed out by Coryllos and Ornstein,³ the difficulties in establishing many indications and classifications as laid down in the past. Differences of opinion as to the selection and grading of individual risks are common, but we feel certain that, although a few cases in class A might be considered as belonging to the two poorer classes, yet the reverse does not obtain. According to our compilation there are 57 in class A, 18 in class B and 25 in class C. The age ranges from 16 years to 65, but averages 30. There are very few under 20 and very few over 50. The series includes 18 cases of tuberculous empyema, 14 uncomplicated, and 4 with either secondary infection, bronchial fistula, or both. Even some of the uncomplicated tuberculous empyema cases were amongst our most difficult problems, especially two that had been left until direct smears showed a high content of bacilli.

There is little about the treatment of tuberculous empyema not covered some years ago by the writings of Archibald⁴ and Hedblom.⁵ However, we wish to stress more than ever the dangers of letting these patients go without surgical treatment, not only because of the difficulties of mixed infection and bronchial fistula but also on account of the problems arising from the increasing numbers of tubercle bacilli in the pleural fluid. Cases in which the bacilli have been demonstrated only by guinea-pig inoculation or by culture have given us no trouble, but two that were not operated on until the direct smear showed a high content of bacilli were real

* A paper read at the Annual Meeting of the New Brunswick Medical Society, Bathurst, N.B., September 9, 1936.

problems. Both of these had a tuberculous infection of the chest wall as the result of repeated aspirations. They provided two of the four deaths in the second half of our series.

It is interesting to divide this series of 100 cases into years (Table I), because the series represents practically all the cases done from one district, the Province of New Brunswick, without many from other places. Since this series represents the work of the whole province it is not difficult to calculate the number of cases that should be done in Canada annually at the same level of efficiency. At this rate, at least 500 cases of pulmonary tuberculosis should be treated by thoracoplasty in Canada annually. And with adequate organization this figure would probably be doubled. This then should not be considered a procedure for only the occasional case, but rather an operation that should concern every practitioner, not only the specialist.

The rapid increase in the number of cases in the last few years is largely due to four factors. (1) The gradual development in the skill of both physician and surgeon in the selection of cases, improved operative technique, better anaesthesia, and more competent after-care. In short, as in other clinics during the past few years, we have emerged from the experimental stage. (2) Artificial pneumothorax sooner or later becomes inadequate on account of adhesions or empyema in a definite, though relatively small, percentage of cases. Thoracoplasty operations would be indispensable if only to treat such cases. Forty-six cases of this series of 100 had previously been treated by pneumothorax which had either never been adequate, had been given up too soon, or had become complicated by fluid or adhesions. The more widespread use of pneumothorax has therefore caused a similar relative increase in thoracoplasties. (3) As the results of the operation have accumulated there has been a marked growth in the confidence of the patients. Although as the years have passed we have gradually taken on poorer risks, yet we have always refrained from operating on early active or hopeless cases. As a result of this policy the enthusiasm of the patients is so great that they refuse permission for operation much less often than do we refuse those asking for it. (4) The better organization of the work against tuberculosis through-

out the province. Much has been accomplished in this way, but much remains to be done. During the next few years in the thoracoplasty results, as well as in all work for eradicating tuberculosis, the great need is for better organization, rather than more skill on the part of either the physician or the surgeon. As we look about the country it is the best organized state or province that is doing the best work in collapse therapy, rather than the one with the most brilliant physician or the most skilful surgeon.

THE OPERATION

The cases here reported naturally fall into two equal groups. In the first series of 50 patients the Sauerbruch⁶ type of operation was done, removing only moderate lengths from eleven ribs, and dividing the whole procedure into two stages. In about half of this former series the major operation was preceded by a phrenic avulsion; and in a similar number the lower ribs were resected first. In these earlier cases the entire resection seldom removed more than forty-five inches, and it was unusual to resect more than one inch from the first rib. Very few cases were treated by partial thoracoplasty, that is, resecting portions from only four, six or eight ribs.

The second series of 50 patients was managed in a very different way. This group was operated on during the period in which the trend was away from the more conservative operation of the Sauerbruch type back to the more radical resections of the Brauer-Friedrich type. For some years prior to 1930 the conservative operation had become standardized and almost universally adopted, but during this same period a spirit of dissatisfaction arose because a number of the larger cavities, especially if thick-walled and centrally placed, remained open after the operation. The need for a more radical resection of the ribs was soon seen, but with us, as with many others, no effective alteration was made in the operation until Alexander⁷ demonstrated the ease with which the whole first rib could be removed if the incision was carried well around the angle of the scapula, permitting the removal of the digitations of the serratus anticus from the upper ribs and thereby laying open the axilla. A short time later O'Brien⁸ demonstrated that the whole lengths of all the upper ribs

could be removed without increasing the mortality, if only two or three ribs were removed at a stage. With these two facts known, the trend back to the Brauer-Friedrich type of operation was established.

Brauer and Friedrich first used the operation that bears their name in 1907. By this procedure large segments of the second to the tenth ribs inclusive were removed in one stage. This method, however, was not so effective as it should have been, because the first rib was not removed, and the importance of carrying the resections posteriorly to the transverse processes was not fully realized; and moreover, the mortality rate was prohibitive. These facts led Wilms and Sauerbruch in 1912 to suggest the more conservative operation, removing only moderate lengths of all ribs, but insisting that the resected segments must come from the posterior ends of the ribs, and always removing a small segment of the first rib.

With us, as with many other workers, the recent swing-back to the removal of larger segments of ribs began with the suggestions of Alexander and of O'Brien. In the second series of 50 cases here reported at least seventy inches were resected from eleven ribs instead of forty-five inches; from the upper five ribs, about thirty-two inches instead of sixteen; from the first rib, three to four inches instead of one inch. With the introduction of these changes, partial thoracoplasties have been sufficient relatively more frequently. All cases are operated on in multiple stages, at least three, if eleven ribs are removed. After rather bitter experience we soon realized that with such wide resections, the upper region must be done first. If the lower ribs are removed first there is comparatively little change until after the upper stage, when the collapse comes all at once. The danger of this extensive collapse all at one time, we feel, far outweighs any older arguments as to which ribs to remove first. And, moreover, we have demonstrated that a delay of months between stages is not incompatible with good collapse if a radical upper stage is done first. In our second series phrenic avulsion as a preliminary measure was abandoned. If additional collapse is required and paralysis of the diaphragm seems the logical procedure this should be done after the major operation.

A third series was started in January, 1936. Twenty-three patients were operated on with no mortality in the first nine months, that is, up to the date of writing. The tendency with this last group is toward still more radical procedures and more extensive collapse. The transverse processes are being removed if the case is a fair risk and requires extensive collapse, and especially if the cavities are large and centrally placed. Along with the removal of the transverse processes we are attempting to do the type of external pneumolysis suggested by Semb, of Oslo. In this procedure an effort is made after the removal of the upper ribs to allow the apex to drop still further, by freeing it from the remaining fibrous attachments above and from the stumps of the transverse processes and sides of the vertebræ posteriorly.

As we begin to adopt these further manoeuvres, involving more definite manipulations of the diseased area, we are concerned not so much about an increase in the immediate mortality as with spreads to the contralateral lung, especially in cases with large cavities with copious and markedly positive sputum. It is in such cases that endotracheal anaesthesia with suction, as advocated by Coryllos,⁹ finds greatest application. Also, in these patients, in order to combine the most extreme collapse with the minimum risk of bronchogenic spread of disease, it would seem wiser to resect only moderate lengths at the posterior stages, and to do routine anterolateral resections. In this way we feel there is less actual pressure over the diseased area than if the whole lengths of rib are removed at the posterior operation.

The whole question of the anterolateral costectomy is a perplexing one. In the average case the large posterior resections are adequate, but if the most extreme collapse is necessary undoubtedly it can be obtained only by augmenting the paravertebral operations with an anterior one, removing the small remaining rib stumps with a part of the cartilages. Recently Haight¹⁰ suggested a modification in this procedure. He is dividing the cartilages at the sternal margins, but not removing them. This allows sufficient collapse without totally destroying the rigidity of the anterior chest wall. In the past we have probably used these supplementary procedures less frequently than we should have done, but in cases in which we

planned to do anterior resections they seemed unnecessary after the removal of six- to nine-inch segments posteriorly. If an anterior operation seems necessary before starting it should probably be done no matter how adequate the collapse may seem immediately after the paravertebral stages.

There are at least three types of lesions in which the additional anterolateral costectomy should be considered. (1) Extensive empyemas. (2) Very large, or thick-walled, and centrally placed cavities which are difficult to close; however, most of these are closed more completely by removing the transverse processes and a certain amount of pneumolysis, but in a few anterior costectomy also will be necessary. (3) In all cases where the cavities are situated anteriorly.

During the present year we have done our first bilateral^{3, 11} case, together with one having pneumothorax on the contralateral side; both are amongst our most gratifying results. The resection of the upper ribs on both sides in bilateral apical cavernous disease opens up a large field, important both to the individual operated on and to the public health program for the prevention of the spread of disease.

ANÆSTHESIA

The advances of recent years in the field of anæsthesia have been appreciated no less in thoracic than in other branches of surgery. In the beginning our patients were operated on under local anæsthesia or nitrous oxide and oxygen, preceded by various sedatives, morphine, scopolamine, and, later, by the newer barbiturates. Now for some time we have been routinely using morphine, one and one-half hours before operation, avertin, rectally, one-half hour later, and nitrous oxide and oxygen during the operation. At first we avoided avertin in these cases for fear of depressing the cough too long after operation. But we soon found that as much as an 80 per cent dose did not give a prolonged effect, and that less than this amount was sufficient to give a smooth anæsthesia with much less shock. However, in a few cases with very low blood pressure (in fact 6) avertin caused a somewhat alarming cardiovascular collapse. In such cases we are now using cyclopropane, preceded by small doses of morphine or scopolamine.

Evipan or similar drugs used intravenously, supplemented with nitrous oxide and oxygen, would seem to be a good combination, but we have not tried this method in thoracoplasties.

OPERATIVE AND POST-OPERATIVE COMPLICATIONS

Seldom have tears in the pleura been mentioned in reports of thoracoplasty cases. Yet in any large series this accident has happened a few times. We have never seen any serious effects from this injury, although we believe these patients have definitely more pain after operation. On only two occasions was hæmorrhage a problem. One of the very earliest cases required reopening for bleeding. The other operative hæmorrhage was in one of the first from whom we removed the whole of the first rib. There was severe bleeding from the subclavian vein. Clamps were left on the bleeding point for three days. After removal of these recovery was uneventful. Except for the above factors, the production of excessive primary post-operative shock in these cases is largely a matter of too much operation at one stage.

Infection is somewhat of a problem in thoracoplasties. Hedblom and Van Hazel¹³ reported a combined series showing that wound infection accounted for 8.3 per cent of the recorded deaths. In our earlier cases we had relatively few post-operative infections of the wall, but with the change to the more extensive operation there was a definite increase, on account of two new predisposing factors. (1) Poor circulation, due to the multiple incisions placed more closely and at short intervals caused delayed healing and superficial sloughs. However, this more troublesome than serious complication was readily overcome by excision of the former scars at subsequent stages, thus leaving only one scar when the collapse was completed. (2) A collection of clot and serum, an excellent culture medium, in the region of the apex and under the scapula was the cause of other infections. The large dead space left by the marked dropping of the apex after the upper stage was the cause of this pocket of serum. These more serious infections have been few, with no fatality, and none have occurred recently. This improvement was brought about not by one particular change in technique but rather by more care in watching details, such as skin edges and torn gloves, the main thing being to realize

that there remains a dead space filled with a potential culture medium.

The above complications are not particularly different from those of other operations, but the following two are problems unique to the thoracoplasty treatment of pulmonary tuberculosis. (1) Disturbed physiological balance, due to (a) sudden reduction in the alveolar surface area; (b) paradoxical breathing with marked respiratory shifting of the mediastinum. (2) Post-operative flares or spread of the tuberculous disease, (a) spread in the side operated on; (b) spread to the contralateral lung.

The first difficulty, physiological imbalance, is largely a matter of not doing too extensive resections at one sitting, especially in those cases with little or no evidence of fibrosis, as shown by retraction of the trachea and mediastinal structures. Should respiratory embarrassment occur it usually can be controlled by posturing the patient and keeping him on the side operated on. If this does not suffice oxygen tents and transfusions are indicated. As a matter of fact, very seldom have we had to resort to these latter methods.

The above complications are more or less under control. It is the problem of post-operative "flares" that seems most troublesome at present. We have had 21 of these, 5 on the same side and 16 on the opposite side. There may have been some of the former unnoticed in the early cases, but 16 on the opposite side is probably correct. Of the 5 on the same side, 3 patients show now good results, 1 is a poor result, and 1 is dead. Of the 16 on the opposite

side 5 are good results, 4 are unimproved and 7 are dead. Of the flares on the same side, 2 were in the first series of 50 cases and 3 in the second. Of those on the opposite side 11 were among the first 50 and 5 in the second.

In spite of the more extensive resections of individual ribs, it is quite evident from these figures that there was a marked improvement in the second series of fifty cases, both in the matter of post-operative flares as well as in the mortality rate. Nevertheless, we feel it is most essential to be content with fewer ribs at each stage, especially in borderline cases, that is, those in which the exudative and degenerative phases of the inflammatory process still predominate, for it is in these more or less allergic cases that auto-tuberculinization is feared. This and bronchogenic spread, as already mentioned above in the section on "operation", are the two most important problems at present when we realize how many of the later poor results and later deaths come from the group of post-operative flares.

RESULTS

In classifying our results, we have tried to follow the criteria used by Hedblom and Van Hazel¹³ in their review of more than 3,000 cases. The patients placed in group 1 are living, symptom-free, able to work, and have negative sputum, that is, are apparently cured cases. Those placed in group 2 are living and able to do some work, but they are not entirely symptom-free, and a few occasionally have sputum with tubercle bacilli, that is, the quiescent or the very much improved class. Group 3 are all living, and although none are worse or even unimproved yet their results are not satisfactory; they are the slightly improved cases. As regards the x-ray criteria, there are no patients in groups 1 and 2 with open cavities that can be seen. And both groups have no cases with persistent positive sputum, but in

TABLE I.
SUMMARY OF RESULTS FOR TEN YEARS

Year	Number of cases	Living				Dead—Time after operation															
		Group 1 Apparent cure	Group 2 Very much improved	Group 3 Not satisfactory	Total	First 8 wks.	9-26 wks.	6-12 mos.	Years												Total
									2	3	4	5	6	7	8	9	10	11	12		
1924	6	3	0	0	3	..	..	..	..	1	1	..	..	..	..	1	..	..	3
1925	5	2	1	0	3	1	..	..	..	..	1	..	..	..	..	..	..	..	2
1926	3	1	1	0	2	1	..	..	..	..	..	..	..	..	..	..	..	..	1
1927	2	1	0	1	2	..	..	..	..	..	..	..	..	..	..	..	..	..	0
1928	5	5	0	0	5	..	..	..	..	..	..	..	..	..	..	..	..	..	0
1929	7	4	0	1	5	..	..	..	..	1	1	..	..	..	..	..	..	..	2
1930	3	2	0	0	2	1	..	..	..	..	..	..	..	..	..	..	..	..	1
1931	8	5	0	1	6	1	..	..	1	..	..	..	..	..	..	..	..	..	2
1932	6	3	1	0	4	1	..	1	..	..	..	..	..	..	..	..	..	..	2
1933	17	10	1	3	14	1	..	..	1	1	..	..	..	..	..	..	..	..	3
1934	14	8	4	2	14	..	..	..	..	..	..	..	..	..	..	..	..	..	0
1935	24	1	16	5	22	1	1	..	..	..	..	..	..	..	..	..	..	..	2
12 yrs.	100	45	24	13	82	7	1	1	2	1	2	3	0	0	0	0	1	0	18		

group 2, two or three have had an occasional positive test since the usual six month convalescent period has elapsed. Since the control of our operative cases by culture of the sputum has just been started, the sputum results here reported are all on direct smear alone.

From a public health point of view, a consideration of the sputum results after operation is most important, for with the present type of operation we can conservatively say that 80 per cent are positive before operation and 80 per cent are negative after operation. The negatives before are, of course, largely empyema cases. Whether this point will appear to be as conclusive when all cases are tested by culture (Pinner and Wooley¹⁴) remains to be seen, but we believe it will. With these explanations, the tabulated results require little further comment.

TABLE II.
RESULTS DIVIDED INTO CLASS OF RISK

Class of risk	No. of cases	Group 1 Apparently cured	Group 2 Very much improved	Group 3 Not satisfactory	Late deaths		Early deaths
					T. B.	Non T. B.	
A	57	37	10	6	0	4	0
B	18	7	5	2	2	0	2
C	25	1	9	5	4	0	6

In Table I there are more of the living cases of the last two years in group 2, merely because sufficient time has not elapsed to place them in group 1. Most of these cases will move up to group 1; a few, possibly, will slip to group 3. On the death side of this same table it should be noted that there are no deaths between the early operative cases and those in the third year, except two that we know definitely were not deaths from tuberculosis. Therefore, by no criterion could our early or operative mortality rate be more than 8 per cent for the whole series, or more than 4 per cent for the second half.

Table II shows the cases arranged according to Brunner's classification as to risk. Among 57 class A patients there was not a single operative or early death, and not one of the late deaths was due to tuberculosis. Two of the late deaths not due to tuberculosis were due to anaesthetics given elsewhere; one was due to acute insanity and one to carcinoma of the cervix. All 4 of these patients who died of other causes showed at the time of death excellent thoracoplasty results, so that, correcting for these 4 cases, out of 57 in class A we can say that 51, or 89.5 per cent, gave satisfactory results. And of these 51 the big majority will eventually be in the apparently cured group. Most of the 10 now in group 2, the quiescent or much improved group, are there only because it is too early to judge their final status. Moreover, 2 of the 6 unsatisfactory class A cases will probably show good results after re-operation.

Of course the results of classes B and C are not nearly so satisfactory. However, in class B there are only two late deaths from tuberculosis, and both of these have been reported to us as deaths from other causes, but since we are not certain that this information is reliable in these cases, we feel it is safer to report them as due to tuberculosis. Again, in class B, as in class A, some of the 5 cases reported in group 2, that is very much improved, are so reported only because sufficient time has not elapsed to determine their final status, and some will undoubtedly be classed as apparently cured.

Table III is an attempt to compare the earlier cases treated by a thoracoplasty of the Sauerbruch type with those treated later by the more radical resection. It may seem meaningless to compare the later cases of the

last two or three years with the earlier ones operated on between three and ten years ago. However, with the more radical operation as used in the latter group, the chief dangers would seem to be the early mortality and immediate complications, especially the "flares" in the contralateral lung. In these respects the two series can be compared, and most certainly to the advantage of the latter. If there has been any doubt about the justification of the more radical procedure this doubt has been due to fear of these immediate disadvantages. If the mortality rate and the number of flares are both less in the more radical resections, then there surely can be no argument about the ultimate results. A large percentage of the late deaths from tuberculosis are either in these cases with post-operative flares or in

TABLE III.
COMPARISON OF RESULTS OF SAUERBRUCH
AND BRAUER OPERATIONS

	No. of cases	Group 1 Apparently cured	Group 2 Very much improved	Group 3 Not satisfactory	Late deaths		Early deaths
					T. B.	Non T. B.	
Whole Series 1924-1935	100	45	24	13	6	4	8
First Half 1924-1933 (Sauerbruch)	50	28	3	5	5	3	6
Second Half 1933-1935 (Brauer)	50	17	21	8	1	1	2

those with inadequate operation. With such improvement immediately after the operation in the second series over the first then one would expect the final results to be even more in favour of the group of patients with the more adequate and complete collapse of the diseased area.

With these facts in mind let us compare the good results of the two operations. Although the time elapsed may be too short to compare the number of apparently cured cases in the two series, yet a comparison of the first two groups, apparently cured and much improved, taken together, is instructive. Examined in this way, there are 62 per cent of satisfactory results for the Sauerbruch type as against 76 per cent for the Brauer type.

The permanence of thoracoplasty results was some years ago established by the pioneers. The permanence of established good results is well shown in a summary of our results made three years ago. At that time 19 patients were considered apparently cured. Not one of these has since had any trouble. In a summary a year ago 37 patients were considered apparently cured. Only one of these has had a recurrence, and that was a case originally considered a class C risk when operated on in 1931. Four years later she developed disease on the opposite side; and by present standards this patient had an inadequate operation.

Of the 13 patients classed as improved but not satisfactory there are, 6 class A cases, 2 class B and 5 class C. Of the 6 class A patients 3 from the first series did not have an adequate operation; 1 from the second series is all right as far as the chest is concerned but has a tuberculous hip. The fifth, operated on in 1934, and the sixth, in 1935, still have positive sputum; they will be operated on again, and there is every reason to feel that they will eventually show good results.

Of the two unsatisfactory class B patients one has a cavity on the opposite side and may possibly need a bilateral thoracoplasty, since only seven ribs are removed from the side operated on; the other patient is in apparently good health but has positive sputum occasionally.

Of the 5 unsatisfactory class C cases one is a man of sixty-four, who a year ago, at the time of operation, claimed he was fifty-six, so that we would operate. He is apparently well, but still has positive sputum. The collapse is inadequate, due to an unbelievably thick pleura. The second patient had a post-operative flare but clinically seems to be doing well. The third was a desperate risk, and certainly is better than before his operation ten months ago. At the time of writing he has just been operated on again with the removal of transverse processes along with a moderate amount of pneumolysis for incomplete closure of a large cavity. He still has a chance for a fair result. The fourth was the one mentioned above, operated on in 1931. After four years of good health she developed disease on the other side, probably because she had an inadequate operation. The fifth, after two years has developed a small area on the opposite side. Consequently it can be seen that even some of these thirteen cases, now unsatisfactory, may eventually show good results.

Of the deaths we will say little, other than to list them (Table IV). One or two of the four late deaths from tuberculosis were probably the result of inadequate

operation. The only late death from tuberculosis in the second series was one with empyema with high content of tubercle bacilli in direct smear of the pleural pus, and with the chest wall infected from aspiration. She was better for a time after operation, but all that can be said about her is that she should be another object lesson to enforce thoracoplasty in pyothorax cases. Such cases are amongst our easiest and best if operated on while a smear of the pus shows only occasional bacilli. The four deaths from other causes than tuberculosis in class A are reviewed above in the discussion of Table II.

Of the 8 early or operative deaths one was due to a cerebral embolism; one was due to a post-operative flare-up; two were in empyemas which should have been operated on much earlier; and at least two or three of the remaining four should not have been selected for operation. One of the two empyemas listed as an early death was in good general health after his extrapleural thoracoplasty, but died after a Schede type of "deroofting" operation to close the residual empyema. This fatality was due to a generalized dissemination of disease caused by cutting into tuberculous tissue in the chest wall, resulting from the numerous aspirations.

CONCLUSIONS

Although the 100 patients in this series are classified as good, doubtful, or bad surgical

TABLE IV.
ANALYSIS OF DEATHS

Early	Date of operation	Death, days post-operative	Risk	Cause of death	Remarks
EARLY OR OPERATIVE					
R. S.	1925	54	C	Miliary tuberculosis	Autopsy.
H. T.	1926	48	C	Empyema and progressive tuberculosis	Should have been operated on earlier.
G. O'H.	1930	3	C	Cardio-respiratory	Previous phrenic with very high position of left hemi-diaphragm.
H. P.	1931	12 hours	C	Cardio-respiratory	Autopsy showed stenosis of bronchi with extensive caseous disease in contralateral lung, not demonstrated by x-ray immediately before operation.
J. A. R.	1932	29	C	Tuberculous pneumonia	Poor selection.
W. W.	1933	16	B	Cerebral embolism	Operative accident.
J. G.	1935	120	B	Atelectasis and progressive disease	Too recent activity prior to operation.
C. A.	1936	13	C	Tuberculous pneumonia	After usual thoracoplasty condition good, but died of tuberculous pneumonia following Schede to obliterate residual empyema cavity.
LATE, FROM CAUSES OTHER THAN TUBERCULOSIS					
Date of death					
E. MCG.	1924	1929	A	Post-operative gall bladder	Excellent thoracoplasty result.
R. MCF.	1931	1933	A	Anæsthetic for D. & C.	" " "
F. B.	1932	1933	A	Acute insanity	" " "
V. McK.	1933	1935	A	Carcinoma of cervix	" " "
LATE, FROM TUBERCULOSIS					
McA.	1924	1928	B	Progressive disease?	Died in asylum—good early result.
E. T.	1925	1930	B	" " ?	Possibly death not due to tuberculosis.
E. B.	1929	1933	C	" "	Well one year—reactivation in the other lung from over-work.
E. L.	1929	1933	C	" "	Inadequate collapse and immediate contralateral spread.
M. McG.	1924	1934	C	" "	Inadequate operation.
J. T.	1933	1936	C	" "	Delayed operation in empyema. Pure culture of tubercle bacilli.

risks for thoracoplasty, yet according to the classification of the National Tuberculosis Association most of them are far-advanced cases, a few moderately advanced, but none are minimal. Our results here presented correspond rather closely with those of other institutions, and nearly all workers feel that without operation the figures would be at least reversed; but few had the opportunity of so conclusively demonstrating this fact as have Freedlander and Wolpaw.¹⁵ These observers have recently reported a series of 143 patients of whom 58 refused operation and 85 were operated on. Two years later 66 per cent of the 85 who received a thoracoplasty were in good condition, while only 17 per cent of the 58 could be considered in as good health. This same series of 143 was divided into "good chronics" and "slipping cases". The operated-on good chronics showed 75 per cent of good results as against 25 per cent for those not operated on. In the slipping cases or doubtful risks, 57 per cent of those operated on were satisfactory, while only 8 per cent of those not operated on were in good health.

SUMMARY

1. Thoracoplasty is the treatment of choice in a large number of cases, too many of which are still diagnosed only when far advanced, after the optimum time for other forms of treatment has passed.

2. Modern thoracoplasty operations are not a less effective substitute for a pneumothorax, but rather can give just as adequate collapse as the most satisfactory pneumothorax.¹⁶

3. By this method 60 to 80 per cent of selected far-advanced cases can be restored to useful

and happy existence; and this can be increased to 90 per cent if the selection be confined to the ideal "good chronics".

4. When we realize that many patients are now being treated in this way throughout the country, and the majority of these are thus made non-infectious, we must not overlook the importance of these measures in the public health preventive program.

5. And, finally, the immediate mortality rate is relatively low in the whole series and reduced to a minimum in class A risks.

In presenting this report, we wish to pay tribute to Dr. H. A. Farris, whose initiative was responsible for the comparatively early start in this work at our institution. The first thirteen cases were operated on by the late Dr. J. H. Allingham and the next twenty-five by Dr. G. A. B. Addy.

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ACUTE APPENDICITIS.—L. Lazzarini records his observations on 800 cases of appendicitis which were operated on in the surgical emergency block of the Ospedale Maggiore of Milan from 1932 to 1935. Their annual distribution and fatality rate were as follows: 1932, 133 cases with thirty deaths (22.5 per cent); 1933, 174 cases with twenty-five deaths (14.3 per cent); 1934, 231 cases with twenty-one deaths (9 per cent); 1935, 262 cases with nineteen deaths (7.25 per cent). In all the

cases immediate operation was performed, in almost all the appendix showed areas of gangrene or perforation, and in most of the cases the patients had been ill several days and had been treated by purgatives or enemata. In addition to the importance of operating within twenty-four to forty-eight hours from the onset of the attack, the writer emphasizes the necessity of removing the focus of infection and of ample drainage of Douglas's pouch. —*Rif. med.*, January 23, 1937, p. 123. Abs. in *Brit. M. J.*

FUNCTIONAL DISTURBANCES OF THE COLON: THE IRRITABLE (SPASTIC) COLON*

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THE immediate interest and importance of certain clinical observations will perhaps serve as a justification for considering briefly the problem of functional colon disorders concerning which so much has already been written. These observations gain force if set down a group of propositions.

1. The diagnosis of vague abdominal symptoms continues to be a common and pressing problem for the physician.

2. The present status of abdominal diagnosis and its practical application in abdominal surgery is not altogether satisfactory. Too much faith is placed in surgery as the panacea for ailments of the abdomen.

3. The diagnosis of chronic appendicitis as an explanation for vague digestive symptoms has fallen into disuse.

4. The present tendency to ascribe such digestive symptoms to chronic cholecystitis is leading to therapeutic disappointment. A revised conception of the physiology of the biliary tract, and particularly the growing realization that surgery is an inadequate solution for the problem of the non-calculous gall bladder have weakened further the position in this respect.

5. Recurring pain in the right iliac fossa after operation is a common condition, and its explanation by the term "adhesions" is too facile and still too commonly made.

6. Functional colon disorders are a common cause of abdominal symptoms and would seem to be becoming more frequent.

7. The anatomy and physiology of the gastrointestinal tract as a basis for clinical practice are inadequately understood. This applies particularly to the colon.

8. There is no place where the failure to make an adequate distinction between functional and organic disorders is more evident

than in conditions pertaining to the abdomen.

9. The failure to recognize the normal physiological limits of the colon results in over-activity of function being mistaken for actual intestinal disease.

In the light of these observations functional colon disorders assume an added significance. Their importance is further emphasized by the fact that in practice there are many cases with abdominal distress and flatulence that cannot be brought under the common categories of abdominal diseases, such as peptic ulcer or cholecystitis. Our clinical shortcomings in this connection are less in the technique of examination and treatment than in fundamental conceptions and diagnosis. We are apt to lack a clear understanding of what is involved in a disturbance of the normal functions of the bowel. For this reason it seemed desirable to set down at least the most common syndrome met with in functional disorders of the colon. It is recognized, further, that the circumstances surrounding colon disorders supply a group of texts upon each of which might be preached a clinical sermon.

TERMINOLOGY

A clear conception of the state which ensues when the normal physiological processes of the colon are disturbed, either following nervous fatigue or as part of a general bodily state, has been hindered by the confused terminology which has prevailed. The term "colitis", most commonly employed, is an ill-defined, vague one, frequently used to describe a variety of complaints such as flatulence and constipation, and as such its use in this connection is comparable to the "liver trouble" of a generation ago. There is now general agreement that the term "colitis" should be reserved for those conditions in which actual inflammation of the colon can be demonstrated—the most common types being amœbic colitis, chronic ulcerative

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colitis, and tuberculous colitis. The term "spastic constipation" is hardly comprehensive enough. Other variants are "unstable colon" (Kantor) and "spastic colon" (Ryle). Probably the best term is "irritable (or spastic) colon", introduced by Sippy over twenty years ago. Yet it is recognized that even this term is inadequate, as it calls attention only to the colonic part of the disorder. However, it would seem to be the best available way of designating the condition, and is a distinct advance over the old terms "nervous indigestion", and "intestinal indigestion". Irritable colon, then, is the description of a clinical syndrome which, while lacking a pathological basis, presents a group of well-defined symptoms which are the expression of a disturbance of function. The syndrome is characterized by recurring abdominal distress, irregularity of the bowel, and flatulence, associated in many cases with nervous instability.

There is an increasing interest in the condition, in England, in the writings of Hurst,¹ Stacey Wilson, Ryle² and Spriggs,³ and, on this continent, in the work of Kantor, Jordan, Kruse³ and Eggleston.

THE PHYSIOLOGY OF THE COLON

The essential points may be stated briefly. The size of the colon varies with the volume of its contents; its natural condition is to be more or less full, and the attempt to keep it empty by laxatives or large enemata is based on a misconception of its function. Generally, the iliac colon tends to be empty and the cæcum and ascending colon full, a state of affairs which should be kept in mind as the irritable colon in many instances tends to be an exaggeration of this condition. The position of the colon tends to no pattern but shows the widest variation. As Barclay puts it, the healthy bowel requires "absolute freedom of movement and an entire absence of fixed points". The motor activity of the colon serves the functions of absorption in the proximal part and propulsion in the distal portion. Two features are important—the gastro-colic reflex occurring when food enters the stomach and resulting in a mass movement of the colon contents from the ascending colon to the pelvic colon, and the rectal reflex of defæcation, which, as Hurst has pointed out, is a conditioned reflex, constipation being a

failure of this conditioned reflex to operate. The secretion of mucus is an important function, the mucus serving as a lubricant and as a protection against penetration of harmful bacteria. The amount of mucus secreted varies with the degree of colonic irritation, which may come either from local causes such as laxatives or, more commonly, from central causes such as excessive nervous activity. The movements of the colon are dependent on the nervous plexus in the bowel wall, but are influenced by impulses from the sympathetic and parasympathetic systems. While stimulation of the former is in the main inhibitory, the effect of impulses from the parasympathetic (including the *vagus*) is to increase tone and thus produce spasm. In respect to sensory function, there may be referred pain to somatic segments (Mackenzie) and true visceral pain which is a result of increased tension in the muscle wall of the colon. The latter is the type of pain occurring in irritable colon.

The action of the bacteria in the colon helps to regulate colonic activity. Williams and Olmsted⁴ have shown that the so-called "bulk" is not inert material, but is acted upon by bacteria, producing split-products which stimulate the intestine. The food residues most extensively broken down are the most laxative, whereas residues containing substantial amounts of lignin, such as the residue from bran, are resistant to bacterial action and give hard irritating stools. Bran for this reason is an undesirable laxative.

DISTURBED FUNCTIONS OF THE COLON AND THEIR CAUSES

Whatever the primary factors may be, the syndrome of irritable colon would appear to be a local neuromuscular disturbance resulting in hypertonicity and hyperirritability. There is a resulting motor incoordination which may affect the movement of the contents of the colon, but may also cause a more rapid emptying of the upper intestinal tract, bringing semi-digested food into the colon, causing increased irritation, and producing fermentation and flatulence. The tonus disturbance affects the sensory function, to cause sustained aching pain due to increased tension in the muscle fibres. Fluid absorption is affected and is usually excessive, producing the constipated

"dog stool". The bacterial action on the cellulose bulk is disturbed, leading to further flatulence and constipation. The normal secretion of mucus may be increased by the increased irritation of the colonic mucous membrane.

The factors in this disturbance of the neuromuscular mechanism of the colon are of several types, and one or more may be operating in a given case. The most common and the most important is an unstable or poorly coordinated nervous system, which under the stress of worry, emotional states, or overwork expresses itself in an imbalance of the autonomic control of the bowel. Along with this central factor are the local factors of constant catharsis and enemata, injudicious dietary habits, and constipation. Local reflex factors, such as appendical irritation, gall-bladder disease, and peptic ulcer may play a part. And, finally, more general reflex factors may be states of exhaustion, thyrotoxicosis, or pulmonary tuberculosis. Any condition which will produce fatigue, either mental or physical, may be sufficient to disturb the functional balance and release a train of disorders. Anatomical irregularities of the intestine are seldom important, and while much has been written about ptosis, redundancies, and caecal abnormalities these appear to play little part in the irritable colon. It has been suggested that allergy may be a factor, but experience would seem to show that this occurs in only a few people and then only in a minor way.

In any functional disturbance it is a difficult problem to work out what is cause and what is effect and to analyze the complexity of factors involved. Most cases of irritable colon represent a visceral neurosis, associated as they are with certain physical and psychological types of persons. But it is too facile a resolution of the problem to regard a neurosis as the exciting factor in all cases. In many instances it is difficult to establish any neurogenic factor. Similarly, in other cases the disturbance occurs in the absence of constipation or the cathartic habit. And, further, it does not always obtain in individuals suffering from chronic exhaustion, but may occur in the most robust who may possess a hyperactive nervous system.

Our discussion has constantly referred to the spastic colon. The apparently contrasted con-

dition, so-called atonic constipation, occurs infrequently. The atonic state in such cases we believe is a phase of the underlying imbalance of the autonomic nervous control, and usually is found together with spasticity in other parts of the bowel. Both atonia and spasm are expressions of the same functional disturbance.

ETIOLOGY

The present study is based on an analysis of 306 cases of irritable colon observed in private practice.

1. As already indicated, there are at least four etiological factors.

(a) An unstable nervous system. This is reflected in the complaint of nervousness in 131 cases (Table II).

(b) Constipation and the cathartic or enema habit. Of the 306 cases 259 complained of constipation, and 126 or 41 per cent were in the habit of using irritating aperients or enemata.

(c) Associated conditions in the abdomen acting as reflex factors. In this series there were relatively few cases in which organic abdominal disease was discovered while the patients were under our care. Two patients showed a peptic ulcer which responded to medical treatment. Two patients had a diseased gall bladder requiring operation. In eight cases the appendix was removed as a necessary step in treating the colon. This hardly presents a fair picture of the association of irritable colon with other abdominal disorders. We feel that the situation would be more fairly envisaged if a series of cases of peptic ulcer was presented, in which event a considerable percentage would be found with the associated syndrome of irritable colon, delaying the response to the accepted medical regimen of ulcer treatment.

It is noteworthy that previous appendicectomy had been done in 75 of the 306 cases, or in 24 per cent.

TABLE I
SEX AND AGE INCIDENCE
306 cases—male 126; female 180.

Age	Number of cases
10-20	13
20-30	96
30-40	98
40-50	60
50-60	33
60-70	6

(d) *Fatigue.* The close relationship between a general fatigue state and irritable colon is indicated in a striking way by the complaint of fatigability in 203 cases, or 66 per cent.

2. *Age-incidence.*—The incidence according to age is given in Table I. Irritable colon is most prevalent in young middle age.

3. *Sex-incidence.*—The sex-incidence, as given in Table I, shows a greater proportion of males than has been reported in previous studies. Dawson in 1921 found the proportion of males 30 per cent; Jordan and Kiefer⁵ in 1929, 36 per cent; and Spriggs⁶ in 1931, 66 per cent. This may mean that the proportion of males affected is increasing.

In our experience irritable colon is a common disorder, occurring about as frequently as peptic ulcer.

TABLE II

SYMPTOMS AND THEIR INCIDENCE

<i>Gastro-intestinal symptoms</i>	<i>Number of cases in which symptoms occurred</i>
<i>Pain:</i>	
Generalized abdominal	105
Epigastric	58
In right lower quadrant or right abdomen ..	39
In left lower quadrant or left abdomen ..	7
Lower abdomen	26
Upper abdomen	17
Vague shifting crampy pain	12
Soreness or very little pain	42
Flatulence	212
Constipation	259
Cathartic or enema habit	126
Nausea and vomiting	40
Diarrhoea	15
Mucus	8
<i>General symptoms:</i>	
Nervousness	131
Fatigability	203
Palpitation	81

The appendix had been removed in 75 cases.

SYMPTOMATOLOGY

The symptoms and their incidence are shown in Table II. Abdominal distress, constipation, and flatulence are the leading complaints. The distress varies from a deep-seated continuous aching discomfort to severe cramp-like pain. It is apt to be shifting in character, and is irregular and intermittent. In this series the distress was more commonly generalized than epigastric, and occurred commonly in the right lower quadrant only. It usually comes on within an hour after food, but as a rule there is no time relationship. It is very apt to appear in the early morning from 4 a.m. to 6 a.m. It is apt to be aggravated by fresh fruits, cold

drinks, constipation, or worry and fatigue, and is relieved by rest, the passing of flatus, local heat or a bowel movement. It should be emphasized that the epigastric pain may simulate typical ulcer distress. Nausea and vomiting occur in about 15 per cent.

Subjective flatulence with gaseous eructations is almost as common a complaint as abdominal distress. As a rule this flatulence is not accompanied by objective distension. Constipation is almost a constant complaint, although it should be pointed out that in this series 10 per cent had reasonably normal bowel evacuations. Diarrhoea is not common.

Linked with these intestinal complaints are numerous symptoms, the chief of which are fatigability, subjective nervousness, palpitation, dizziness, "heart pain", headache, and mental depression. A proper understanding of the relationship and interaction of these complaints of the nervously hyperactive individual with the more localized symptoms of abdominal discomfort is the keynote to the diagnosis of irritable colon.

CLINICAL FEATURES

In addition to clinical evidence of nervous instability and chronic fatigue there are two findings on abdominal examination that are of importance (Table III). The first is the presence of colon tenderness either in some part or along virtually the whole of its course. Occasionally there may be generalized abdominal tenderness. We are inclined to stress this finding more than Ryle, who lays chief emphasis upon the second finding—the palpation of segments of the colon, which are felt as a firm contracted cylinder. Normally, the colon is palpable in the left iliac fossa, but in these cases it may often resemble a cord. Associated with these findings there is frequently a lax and boggy cæcum. Rectal examination is essential. Proctitis, anal fissures, hæmorrhoids, and a congenitally small canal may give rise to reflex spasm in the colon.

TABLE III

ABDOMINAL EXAMINATION

The findings on abdominal examination in order of frequency:

1. Tenderness of the colon.
2. General abdominal tenderness.
3. Spastic descending colon and boggy cæcum.
4. Selective colon tenderness (ascending colon or sigmoid colon).

Stool examination.—The stools show great variation, but are most likely to be mushy or dry and marble-like in character.

Sigmoidoscopic examination.—Is primarily important in ruling out neoplasms, early ulcerative colitis, and amœbic dysentery. In irritable colon the mucous membrane is everywhere normal; there may be spasm or irritability.

TABLE IV
GASTRIC ANALYSIS

Fractional gastric analysis in 218 cases showed:

Achlorhydria	31
Hypochlorhydria	58
Normal acidity	111
Hyperchlorhydria	18

Gastric analysis.—Fractional gastric analysis was carried out in 218 of the cases in the present series. The values are set forth in Table IV. These results correspond closely with those reported by Jordan and Kiefer, but are at variance with those of Von Noorden, who found hyperacidity in 70 to 80 per cent of his cases.

Roentgen-ray examination.—The roentgenological findings are not to be relied upon exclusively in reaching a diagnosis of irritable colon. The chief value of such an examination is in ruling out organic disease of the bowel and in a study of the bowel form. For this purpose the barium meal is preferable. The barium enema is likely to overcome spasm, and is therefore apt to give a fallacious picture of the true state of the colon. The study of the barium meal in our experience gave valuable corroborative evidence in about three-fourths of the cases. The most common findings are general spasticity of the colon, a spastic sigmoid with a dilated cæcum, and segmental irritation phenomena. In about half the cases there was delay in the passage of the meal through the colon.

DIAGNOSIS

The history is the essential factor in the diagnosis. Abdominal distress of the character described, flatulence, constipation, and associated nervous symptoms constitute the significant features. The physical findings of selective colon tenderness or contracted segments of the colon, and the roentgenological observations are the other important diagnostic criteria. It is essential, of course, that the diagnosis of irritable colon should be made only after

organic disease of the bowel has been excluded and full consideration given to the possibility of organic disease elsewhere in the body, which may appreciably modify the conclusion.

The chief diagnostic error is to attribute the symptoms of irritable colon to chronic appendicitis, biliary tract disease, or peptic ulcer. Since the notable observation of Treves, more than thirty years ago, a succession of writers has pointed out that the chief reason for the failure of appendicectomy to relieve symptoms is the presence of colitis. Other diagnostic procedures should make it possible to differentiate with a high degree of accuracy peptic ulcer and disease of the biliary tract.

It is of course a grave clinical shortcoming to dismiss a case of this type as simply a neurosis, and to rest on a diagnosis of constipation is to fail to appreciate the extent and the significance of the disorder.

So-called mucous colitis would appear to be a more severe form of irritable colon in which the symptoms—abdominal and nervous—are more pronounced and the condition more deeply seated. For this reason it is more resistant to treatment.

TREATMENT

The principles of treatment are the elimination of the faulty habits which tend to increase the general nervous instability, the improvement of the mechanical function of the bowel, and the restoration of the normal tone of the colon. Reassurance of the patient is a first essential, pointing out to him that there is no primary disease in the colon but that this local disorder is part of a general condition. The necessity for adequate routine rest, mental and physical relaxation, regular holidays, and the avoiding of hurry and overwork is stressed. The diet at first should be bland, omitting bulky starchy foods, keeping in mind the patient's general nutrition. The foods may be increased as rapidly as the patient's tolerance permits, adding stewed fruits and vegetables, and finally raw fruits. Considerable harm may be done by keeping a patient on a restricted smooth diet over a long period.

Purgatives are entirely forbidden. Re-education of the bowel demands above all the establishing of the conditioned defæcation reflex. The habit of prescribing liquid paraffin

has been followed at the expense of neglecting the more essential advice concerning how the bowel reflex may be secured. This involves at first the introduction of three ounces of warm olive oil into the rectum at bedtime, with a regular time for stool in the morning, when a small injection of about three ounces of tap water may be made if there is no result. In this way a habit is acquired and the stimulating measures can gradually be eliminated. Liquid paraffin in varying amounts is a useful accessory, but in our experience patients frequently object to the leakage that results. Frequently the oil does not mix well with the faecal material, and in many cases it proves to be an actual irritant, giving rise to unpleasant effects. We have had better results from using an emulsion of paraffin oil and agar-agar or Irish moss. Colonic irrigations are unphysiological and pernicious.

Heat to the abdomen may be required if the abdominal distress is severe. In spite of the strictures which Bastedo and others have recently passed upon its use, there would seem to be no question of the benefits to be obtained from the tincture of belladonna, which may be given in a dose of 10 minims three times a day. The dosage may frequently be increased to the point of physiological tolerance. At the outset of treatment, and as occasion demands, the use of mild sedation in the form of the bromides or luminal is helpful. If luminal (phenobarbital) is used it should be in moderate dosage and for short periods of time only, as we have found in the last two or three years an increasing number of cases in which a toxic skin eruption develops after its use.

A program of treatment incorporating these few simple measures will give relief in the

great majority of cases. As in all functional disorders there will be recurrences, but persistence in following up these principles will bring about gradual improvement and will protect the patient from the ill-advised measures for bowel disorders which abound in our midst today.

SUMMARY

1. Irritable colon is a common cause of abdominal symptoms.
2. Because of the tendency to attribute digestive symptoms to pathological changes in the gall bladder or appendix the characteristic clinical picture of the irritable colon is emphasized. A knowledge of this condition helps to clarify the handling of abdominal disorders.
3. The clinical syndrome of the irritable colon is based on a knowledge of the normal physiological processes of the colon.
4. The diagnosis of irritable colon rests upon an understanding of the interaction between an unstable nervous system and the more localized symptoms of an intestinal disorder.
5. Satisfactory therapeutic results may be obtained in a high percentage of cases by following certain principles of treatment.

I desire to express my thanks and appreciation to Doctor D. S. Macnab for his assistance and for permission to investigate cases under his charge.

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DIAGNOSIS OF CORONARY INFARCT.—R. Teufel points out that the diagnosis of coronary thrombosis is not difficult in a patient with frequent attacks of angina pectoris. It is often missed when it occurs during the first anginal attack or in those cases in which the pain is atypical or in the absence of angina. The intensity and duration of the pain allow of no conclusions being drawn as to the extent of anatomical disturbance. Episterno-cardiac rub and x-ray proof of an aneurysm of the heart are two signs but rarely elicited. Changes in the electrocardiogram may be diagnostic of infarct, but they are transitory, and the apparatus is rarely to hand when required. Examination of the heart by percussion

and auscultation is often negative. Raised temperature and leucocytosis are inconstant signs. Lowering of the blood pressure is difficult to assess if the original pressure is not known. Tachycardia and disturbances of conduction are valueless signs. A transitory hyperglycæmia occurs, but is of little worth in diagnosis. The sedimentation rate is increased, but in five of the author's fatal cases it was normal. In Weltmann's serum coagulation test, however (*Wien. Arch. inn. Med.*, 1936, 28), Teufel claims to have found a reliable diagnostic test for coronary thrombosis. He used it successfully in 28 cases, of which 17 came to necropsy.—*Wien. klin. Wschr.*, January 15, 1937, p. 58. Abs. in *Brit. M. J.*

THE PROGNOSTIC VALUE OF ROUTINE BLOOD PRESSURE TESTS IN PULMONARY TUBERCULOSIS*

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THE study described below was undertaken to secure if possible some means of using blood pressure determinations as an aid to prognosis in cases of pulmonary tuberculosis.

Much has been written on the subject of blood pressure in pulmonary tuberculosis. What has been referred to as the apparently protective action or influence of a systemic hypertension on pulmonary tuberculosis is a commonly accepted fact. It is generally believed that patients with systemic hypertension and pulmonary tuberculosis tend to have relatively little tuberculous lung disease, or in any case tend to heal the latter more quickly than people with normal or subnormal blood pressure. Therefore, the co-existence of pulmonary tuberculosis with an increased blood pressure is recognized as offering a definitely more hopeful prognosis.

It is also an accepted fact that active and progressing pulmonary tuberculosis is accompanied by lowering of blood pressure. Many statistical studies show that for far advanced cases of pulmonary tuberculosis the mortality is increased in patients whose blood pressure is subnormal, or even at the lower limit of normal. Many observers have noted the progressive drop in systolic, diastolic and pulse pressure that occurs in the last few weeks or months of life in terminal cases of pulmonary tuberculosis.

It is admitted of course that the use of blood pressure determinations in pulmonary tuberculosis can at present be of little prognostic value in cases where sudden bronchogenic spread occurs. The majority of cases of pulmonary tuberculosis however, tend to show progressive improvement or retrogression, the degree of improvement or otherwise of course varying greatly. A considerable number of patients with pulmonary tuberculosis have a

blood pressure which is neither hypertensive nor yet indicative of hypotension. The prognosis within this large group varies greatly. In time, for those cases in which the disease is progressive we can recognize a definitely lower level of blood pressure, taken as usual in the morning. In many instances the fall in blood pressure is picked up after the occurrence of other prevailing data of unfavourable import, such as, loss of weight, x-ray evidence of spread of disease, increase in cough and expectoration, etc. Therefore, where on routine blood pressure determinations, hypertension does not exist, and before marked hypotension appears, earlier diagnosis of impaired cardiovascular tone should be valuable in our prognosis of cases of pulmonary tuberculosis.

Preliminary blood pressure studies performed in 1933 to 1934 showed that for similar and rather low blood pressures in many tuberculous cases there was a great difference in the fall of blood pressure secured after sleep in the afternoon. Studies proved that for people with very similar blood pressures the percentage fall in systolic and diastolic blood pressure was definitely greater in those who were, or later did, poorly.

Extensive blood pressure studies in relation to tuberculosis have included blood pressure response to exercise, systolic blood pressure, diastolic blood pressure, pulse pressure, and the effect of high intrapleural pressure on blood pressure. We began our study in November, 1934. Morning blood pressures were taken on a group of patients about 10.00 a.m. after at least 60 minutes rest in bed. This procedure we believed would constitute our control, or, rather, our series of comparison blood pressures. On the entire group, for at least three months, blood pressures were taken in the morning every two weeks.

The total number of patients studied was 85. All were under blood pressure study for at

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least three months, and the period of active study varied from three months to seven months. In addition, patients were observed as to their condition for some months longer, or until December 1, 1935. By this date the period of active blood pressure study and the ensuing continued observation of condition for the individual case varied from eight to twelve months, inclusive. Most of the patients to be studied had far advanced pulmonary tuberculosis. Actually, of our 85 cases there were only 2 with minimal lung lesions, and 4 with only moderately advanced pulmonary tuberculosis.

BLOOD PRESSURE RESPONSE TO A CONTROLLED STIMULUS

Between August 28, 1935, and May 1, 1936, the blood pressure response to cold was tested on 80 patients. For some cases the test was repeated from one to six times, at intervals of a few weeks to a few months. By September 1, 1936, therefore, each patient had been observed for from three to twelve months, from the date of his first, or only test, if only one was done. For slightly over two-thirds of the cases the period elapsing from the first test was five months or more. Whatever the period, the case records of the patient as to progress were available for six months to several years back.

The technique of the test was as follows.

The patient in the prone position, and in bed for at least one hour previously, had his blood pressure taken for at least ten minutes, or until it settled down to a stable level. The contralateral hand, including the wrist, was then immersed in cold water at 4°C. for 25 seconds. The blood pressure was then taken as the hand was withdrawn from the cold water, and every half minute until it settled back to its former level. A record was kept in each case of (1) the initial pressure; (2) blood pressure immediately after immersion of hand in cold water ceased, and (3) the time-interval before the basal blood pressure was resumed.

In all blood pressure determinations the reading was made on a mercury manometer, the left arm being used and the patient being in a prone position. Systolic blood pressure was recorded at the level at which sounds first became continuous, on decompression of the cuff. Diastolic readings were recorded at the point on continued decompression of the cuff at which the sound heard over the bend of the elbow became rather suddenly altered and lowered in intensity.

It is not within the scope of this paper to attempt any explanation of how tuberculosis affects blood pressure. Whether tuberculosis toxæmia may affect the myocardium, the peripheral circulation, or, centrally, the vasomotor centre, has been discussed in the literature.

The relation of systemic hypertension to pulmonary tuberculosis may indicate that the type of constitution that tends to cause systemic hypertension may bear with it an increased resistance to tuberculosis. The high blood pressure *per se* may be the factor favourably influencing the lung lesion.

In this study we are therefore presenting the data showing the value and limitations in prognosis of ordinary blood pressure determinations taken in the morning. For certain levels of blood pressure these figures are of value in making a prognosis, but such determinations have for many years been known to offer no true aid to prognosis where the tuberculous patient had a normal or low normal blood pressure.

The value of the blood pressure response to cold will also be shown for 80 cases. For 20 of these latter cases the cold test was done at a time when we had for each of the 20 a record for some months of the ordinary morning blood pressure readings shown. The data given for response to cold are partly statistical, but are chiefly intended to show for individual cases of tuberculosis, or type cases of the same, that for the given case much more prognostic aid was secured by this method than could be derived by even frequent ordinary blood pressure determinations.

Eighty-five patients in all were studied by morning blood pressure determinations. Patients are classified according to their present condition and progress up to date (December 1, 1935), as follows:—(1) dead, (2) poor condition, (3) no change, (4) improved.

The term "improved" means that the patient during the period of observation of 8 to 12 months had definitely improved, or had maintained a state of definite improvement gained prior to the beginning of the period of observation. Where the definite improvement occurred during the period of observation there were in all cases progressive gain in weight, reduction in sputum, and x-ray evidence of definite clearing in lung disease. The degree of improvement varied with individuals, of course. The term "no change" includes all who are certainly no worse, but either have shown no improvement or such slight betterment as to leave a doubt as to whether or not the improvement will continue. The individuals within the group

show a considerable difference in general condition. We believe that in time some of these will be definitely improved and others will be put in the group of "poor condition".

The term "poor condition" is self-explanatory, after describing the two groups above. Table I gives the classification on the above bases for the group of 85.

practice testing in both normals and patients was, I believe, chiefly of value in showing that a reasonable rise in diastolic blood pressure seemed to be the rule with the technique used.

Analysis of results obtained from blood pressure response to cold.—From August 28, 1935, to May, 1936, the "cold test" was applied to 80 patients. For many of these cases the test

TABLE I.

Total No.	Improved No. Percentage	No change No. Percentage	Poor condition No. Percentage	Dead No. Percentage
85	51 60.0	18 21.1x	6 7.0x	10 11.7x

On the basis of their morning blood pressures we classify the entire 85 cases into four groups. The following Table gives the statistics *re* condition for the four groups. It shows that a well-maintained blood pressure is of favourable prognostic import.

was performed on each from two to six times, the interval between tests on the same patient varying from a few weeks to a few months. From August 28, 1935, to September 10, 1935, the test was performed on 20 persons who, belonging to the group of 85 patients in the

TABLE II.

Groups	No.	Improved No. Percentage	No change No. Percentage	Poor condition No. Percentage	Dead No. Percentage
I. Systolic of 118 or over to 136 or over.....	38	34 89.5	4 10.5	0 —	— —
II. Systolic of 110 or over to 128-134 or over..	10	7 70.0	2 20.0	1 10.00	0 —
III. Highest systolic of 120-126	17	8 47.0	6 35.0	1 5.88	2 11.7
IV. Systolic below 120.	20	2 10.0	6 30.0	4 20.00	8 40.0

Before applying the cold test to patients it was performed on 20 adults who were known from x-ray evidence to be free of pulmonary tuberculosis. Also on patients before the series was actually begun the test was done to check technique and to acquire familiarity with the procedure. In our preliminary work it would seem that the temperature of the water could be from 3 to 4.5° C., without materially affecting the response. Cases tended to give a very similar response from day to day within a period of a few weeks. The time of day did not seem to affect the results. The normals tested were male and female, and their ages ranged from 22 years to 65 years.

The highest pre-test, or basal, blood pressure was 168/74, and the others varied from 116/64 to 132/86. The response to cold varied from the lowest of a 6 mm. Hg. rise in both systolic and diastolic blood pressure to the biggest response, which was a rise of 16 mm. Hg. systolic and 12 mm. Hg. diastolic. The preliminary

former series, had had frequent morning blood pressure determinations taken up to and including the period August to September, mentioned above.

The conclusions drawn from this study are dated September 1, 1936, as to present condition, progress, etc. By September, 1936, each patient, if living, had been followed for from 3 to 12 months from the date of their first cold test. The 20 who were tested in August to September, 1935, represented all four groups of morning blood pressure range, listed in Table II.

Response to cold is expressed as the rise in systolic pressure over the rise in diastolic pressure in mm. Hg. Thus a case whose reaction to cold caused an increase in blood pressure from a basal level of 114/74 to 124/80 would have the response expressed as 10/6 mm. Hg.

Five cases were in the highest blood pressure range as taken in the morning. As might be expected, the results were good. One patient,

however, with marked hypertension of 188/78 mm. Hg. and to 190/110 mm. Hg. gave no response to cold. This is to be expected in many cases of long standing hypertension, particularly if associated with marked vessel changes. Another case showing a morning blood pressure range of 168/100 to 212/100 mm. Hg. gave a response of 8/2. The other three cases gave responses varying from 8/4 mm. to 16/18 mm. Hg. All are improved.

Four cases of the 20 belong to Group II of Table II. These had a good morning blood pressure range and all gave a fairly good blood pressure response to cold, the lowest being 6/4 and the highest 12/10. Three of these now are

One other case gave a response of 6/10 mm. Hg. The condition was unchanged for several months following this test, but in the past few months there had been gradual loss of weight with increased disease. The last case of the four gave a response to cold of 12/10 mm. Hg. and her rather sudden and unexpected death, two months later, was shown at autopsy to be due to pulmonary embolism and infarct.

The last 7 cases of the 20 belong to group IV of Table II. On frequent morning blood pressure determinations their systolic blood pressure never reached to 120 mm. Hg. It is in this group that the prognosis is generally poor and also varies greatly. The Table below gives the

TABLE III.

Case No.	Age	Morning range B.P. mm. Hg.	Response to cold mm. Hg.	
			Systolic	Diastolic
1	25	98/58 - 114/72	18	6
2	30	94/60 - 106/68	10	4
3	60	98/64 - 104/72	6	8
4	32	114/60 - 116/68	10	0
5	22	88/62 - 104/62	6	0
6	31	100/78 - 108/50	0	0
7	34	104/80 - 114/80	2	0

definitely improved. One has died. In this case, at the time of first test, a slight increase in lung disease was seen by x-ray. The response to cold at this time was 12/10 mm. Hg. Two months later, with no lowering of the pre-test blood pressure, the response was 4/4 mm. Hg. The disease in the lung was progressive from the time of the first test to five months after the last test, when death occurred.

Four patients of the 20 had a morning range of blood pressure showing that highest systolic pressure ever attained by each was within the zone of 120/126 mm. Hg. In this group of four the value of the cold test first became strikingly apparent. There was, even on ordinary clinical evaluation, a considerable difference in the general condition and prognosis among the four, yet their morning range of blood pressure was quite similar. It was therefore interesting to see the difference in response to cold shown by these patients. The response varied from 0/2 mm. to 26/20 mm. Hg. The patient giving the former response has since died of pulmonary tuberculosis, and the patient giving the latter response has progressed well and now has negative sputum, and is on exercise.

morning range of blood pressure established for each patient and the rise in blood pressure secured from each one.

In each case the time required for blood pressure to return to basal, or pre-test, was recorded. The time varied for the seven from 1/2 minute to 5 minutes, and in general was greater, the higher the rise in blood pressure. Thus case 7 returned to basal level in 1/2 a minute, while case 1 required 5 minutes. For 4 of the cases the time was 1 1/4 to 2 minutes.

The last 4 cases gave no diastolic response to cold. Patients 4, 5 and 6 died eight months, two months, and one month respectively from the date of doing the test. No. 7 was transferred to another sanatorium four months after date of test. At the time of discharge this patient had been an infirmity patient for two years, during which time he showed no gain in weight, no evidence of healing in the lung by x-ray, and no reduction of sputum, which was positive on discharge, as on admission.

One other patient died, namely, No. 3. This patient was in the sanatorium from January 15, 1933, to the date of his death, February 1, 1936. By January, 1934, there was slight

clearing of the disease. By April, 1935, no change in the lung was noted, other than increased cavitation. From April, 1935, to death there was very slight and gradual loss of weight. The test was repeated on November 1, 1935, when no response was secured. An x-ray of chest was then taken and showed fresh disease in the lung. The patient died on February 1, 1936, three months after the latter test.

Patient No. 2, who gave a response of 10/4, is on exercise and with no evidence since of spread of disease in the lungs. Weight has been maintained, and, for a chronic case of far-advanced pulmonary tuberculosis, he seems to be in fair general condition. On February 14, 1936, and on April 21, 1936, the cold test was repeated and on both occasions the response was 10/0 mm. Hg.

Case 1 presented the following data.

<i>Test dates</i>	<i>Basal blood pressure</i>	<i>Response</i>	<i>Return to pre-test level</i>
Aug. 28, 1935	92/72 mm. Hg.	18/6 mm. Hg.	5 minutes
Jan. 11, 1936	98/78 mm. Hg.	4/2 mm. Hg.	1 minute

By August 28, 1935, this patient had healed tuberculous enteritis and had gained 20 pounds in the preceding six months. X-ray of the chest in August, 1935, showed slight spread of disease, and weight was lost from January, 1936, to May, 1936. Since the latter date the condition has been unchanged. The basal blood pressure is similar for both August, 1935, and January 11, 1936.

Eighty patients in all were tested by cold, including the 20 presented above. In the entire 80 tested in this way from August 28, 1935, to May 1, 1936, there were 47 who gave a response to cold of 8 mm. Hg. systolic and 4 mm. Hg. diastolic, or greater, for either systolic or diastolic pressures, or for both. Forty-two of these were tested from August to December, 1935, inclusive, so that at the present date (September 1, 1936) they have each been observed since the test for from approximately 8 to 12 months. Some of these had repeat tests. The response to cold varied for the 47 from 8/4 to 34/10. All 47 had pulmonary tuberculosis. The lung lesion was minimal in 4, moderately advanced in 2, and far advanced in 41 instances.

By our definition of "improved", as stated earlier in this paper, 38 of the 47 showed good enough progress to be included under that

term. There have been 4 deaths. Three patients are in poor condition and 2 show no change. Two of the fatal cases have already been described. The other two are now described briefly. One died four months after a response of 8/10 was given. Autopsy showed a huge cavity in each lung, with relatively very little active disease — "Chronic pulmonary tuberculosis". The last death occurred in a patient who was readmitted in October, 1935, with definite spread of disease in the lung, a basal blood pressure of 102/58, and a response to cold of 8/4 mm. Hg. X-ray of February, 1936, showed clearing in the lung. Later, spread occurred again. Unfortunately the cold test was not repeated until one week before death, when the response was zero. By this time however the basal blood pressure had become 92/52 mm. Hg. The 5 patients who show

no change, or are worse, exemplify the need for repeat tests. For the 47 cases who gave what we took to be a fairly good response to cold the statistics are: Improved—38, or 80.8 per cent; dead—4, or 8.5 per cent; and no change, or worse—5, or 10.7 per cent.

Of the 80 cases 33 gave a response to cold of less than 8/4 mm. Hg. The statistics for these are: Improved—10, or 31.3 per cent; 8, or 24.2 per cent, are dead, and 15, or 45.4 per cent are worse, or show no change.

A few examples are shown below of how in cases of pulmonary tuberculosis with similar blood pressures the response to cold definitely reflects the condition of the patient more accurately than in the single blood pressure reading secured prior to the test. The condition, as stated, is at the date of the test.

A few examples of patients whose pre-test blood pressure is at a reasonable level are shown below. They represent a rather important group, and as subjects of tuberculosis are often loosely referred to as showing poor resistance. Such cases need not necessarily have extensive lung involvement—but rather are characterized by very slow healing of the lesion, sometimes with a tendency to exacerbation of disease. The intervals between repeat

TABLE IV.

Case	Type	Age	Date	Basal B.P.	Response	Condition
I.	A	50	May 1, 1936	108/66	4/0	Spread of disease in lung
	B	48	Feb. 9, 1936	108/68	10/6	Improving
II.	A	30	Aug. 28, 1935	88/64	10/0	No change
	B	36	Jan. 12, 1936	96/60	0	Terminal
III.	A	32	Aug. 28, 1935	102/68	10/0	Poor condition
	B	26	Dec. 3, 1935	102/64	10/6	Improving
IV.	A	31	Nov. 8, 1935	112/70	10/8	Improving
	B	29	Nov. 2, 1935	114/80	4/4	No change

tests on these cases vary, but the repeat tests do seem to indicate a characteristic response.

A few examples of cases whose lung lesion has progressed very favourably are given below. This good progress was reflected in a

of cases indicate a good or poor prognosis, respectively, in pulmonary tuberculosis.

2. The degree of blood pressure response to cold gives a more accurate standard for measuring cardiovascular tone than does the

TABLE V.

Case	Age	Date of tests	Basal B.P.	Response in mm. Hg.
I.	32	(1) Nov. 1, 1935	124/74	6/6
		(2) May 1, 1936	120/80	4/4
II.	27	(1) Nov. 17, 1935	114/94	8/0
		(2) Dec. 21, 1935	130/100	8/0
III.	34	(1) Aug. 28, 1935	118/88	2/0
		(2) Nov. 1, 1935	116/82	2/4
IV.	29	(1) Nov. 2, 1935	114/80	4/4
		(2) May 1, 1936	112/74	6/4
V.	32	(1) Nov. 1, 1935	124/86	8/2
		(2) Jan. 12, 1936	134/94	4/2

maintained good response to cold. It is worthy of note that in these cases the good response was given with sometimes considerable difference in the resting blood pressure at the time of testing. All had far advanced tuberculosis.

It would appear that absence of any diastolic rise in blood pressure in response to the cold test makes the prognosis definitely poor in

ordinary series of single blood pressure determinations as far as the prognosis in pulmonary tuberculosis is concerned.

3. In the large group of patients whose blood pressure is rather low the difference shown among the members of the group in the response to cold indicates the probable course of the lung lesion.

TABLE VI.

Case	Age	Date of tests	Basal B.P.	Response in mm. Hg.
I.	49	(1) Nov. 1, 1935	156/90	12/8
		(2) May 1, 1936	126/80	12/6
II.	28	(1) Sept. 1, 1935	118/92	10/4
		(2) Nov. 20, 1935	106/76	8/8
III.	43	(1) Oct. 28, 1935	116/82	26/0
		(2) Dec. 20, 1935	108/74	26/8
IV.	48	(1) Oct. 28, 1935	112/72	12/6
		(2) Jan. 12, 1936	106/74	16/4

pulmonary tuberculosis. From our series it seems that a rise in systolic blood pressure must be at least 20 mm. Hg., to be of definitely favourable import, if there be no diastolic response.

SUMMARY

1. Ordinary blood pressure determinations, if consistently high or low, in the vast majority

4. Repeat tests are advisable.

5. A response of 8/4 mm. Hg. would seem to be the least rise in blood pressure compatible with a healing case.

6. Patients with pulmonary tuberculosis, minimal to far advanced, who do not heal rapidly, or who tend to show exacerbations, give a poor blood pressure response to cold.

7. In repeat cold tests, where spread of disease in the lung has occurred, the response to cold usually is impaired definitely before there is any drop in basal, or pre-test, blood pressure.

8. The cold test should be routinely applied to all cases of pulmonary tuberculosis in which the highest systolic blood pressure by ordinary morning determinations is not more than 120 to 126 mm. Hg.

9. Patients whose condition, good or poor, is being maintained without appreciable change tend to give a similar blood pressure response to cold, despite moderate changes in the pre-test, or basal, blood pressure.

10. Absence of a rise in diastolic pressure in response to cold implies a definitely unfavourable course of tuberculosis, unless the systolic rise is quite marked.

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CYCLOPROPANE: A REVOLUTIONARY ANÆSTHETIC AGENT*

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RECENTLY I found an old diary which I had written when I was twelve years old. One entry, early in June, read like this, "What do you know! I am going to have my appendix out, will miss examinations, hurrah!" The next entry a few days later said simply, "Had operation, ether was rotten!" I can still remember the suffocating ether, and the post-operative distress, and I am afraid that for many of us personal recollections of the operating table consist mainly in horrid memories of the anæsthetic. This is one reason why thoughtful surgeons and anæsthetists have never felt satisfied that ether, in spite of its unquestioned usefulness, represented the final word in the search for the ideal anæsthetic. Another, and perhaps even more important, reason is that ether has properties which are definitely toxic; it upsets metabolism, producing acidosis; after its prolonged administration the liver and kidneys show toxic changes; and it is a respiratory irritant which has often led to broncho-pneumonia. Therefore, a search for

some better agent has been continuous ever since that day in October, 1846, when Morton first demonstrated ether. Simpson introduced chloroform in 1847, and chloroform was for years the popular anæsthetic, almost to the exclusion of ether, but the medical profession finally realized that the dangers of chloroform as a poison more than outweigh its usefulness. Nitrous oxide with oxygen, discovered by Humphry Davy in 1800, and first used by Horace Wells in 1844, is useful and safe, but cannot take the place of ether in major surgery. In recent years we have seen a bewildering parade of new drugs advocated for anæsthesia. Ethyl chloride, ethylene, acetylene, propylene, tribomethyl alcohol, divinyl oxide, barbituric acid derivatives for intravenous use, and other substances, have all been introduced, and used to some advantage for certain purposes, but each one has some drawback which prevented its acceptance as an improvement on ether for general use.

John Snow, of London, the first and one of the very greatest of anæsthetists, whose untimely death in 1858 retarded for almost a generation scientific progress in anæsthesia, was the first to point out the true dangers of

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chloroform. He preferred ether on account of its greater safety, and yet he was constantly experimenting in search for a more ideal anæsthetic agent. He was disappointed when his trial of "amylene", and "monochloruretted chloride of ethyle" did not fulfill all his expectations, and he has this comment to make in his great textbook on "Anæsthetics" which was completed just before his death:¹ "It is not improbable that, amongst the multitudes of new bodies which chemistry makes known every year, some agent may be found superior to those hitherto used."

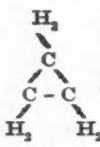
It remained for two Canadian scientists, in the Pharmacological Laboratories of the University of Toronto, in 1928, to make a discovery which to some extent has fulfilled the prophecy of John Snow. Professor Velyien Henderson and Dr. George Lucas were working with propylene when Lucas suggested that its isomer, cyclopropane, might be worth investigating. What followed is best described in their own words.

"Since the introduction of chloroform, ether and nitrous oxide into the realm of anæsthesia, anæsthetists have steadily sought for other drugs which will bring about the desired effect unaccompanied by the metabolic changes these produce. Of various substances tried ethylene appeared the most promising. Propylene, a very closely related substance in laboratory tests was even better, but when it was manufactured and tanked by Squibb it developed some toxic properties which, heretofore, were entirely absent. In searching for the cause of this toxicity one of us suggested cyclopropane, an isomer, which frequently appears during the preparation of propylene. The first few experiments with this gas showed to our surprise that it was not toxic and was a more powerful anæsthetic than the propylene. Since it exhibited such anæsthetic potency and chemically should be very inert because of its cyclic structure, we determined to continue the research with this gas in the hope of having found a substance which might produce anæsthesia without affecting metabolism to any extent."²

Henderson and Lucas carried out experiments with cyclopropane on cats and rabbits and came to the conclusion that here at last was an anæsthetic agent the use of which was not accompanied by a metabolic upset such as had been considered an unavoidable accompaniment of anæsthesia. They found that "the figures for pH and CO₂-combining power remain more normal than with any other anæsthetic," that "cyclopropane appeared to be an anæsthetic with a high potency, some 10 to 12 per cent producing deep anæsthesia. Respiration fails before the heart and circulation. The heart

seems to be but little affected. Recovery appears to be prompt and with little after-effects. Metabolic effects appear to be slight or absent." Henderson and Lucas first reported their discovery at the meeting of the Canadian Medical Association in Montreal in 1929, and the first paper on the subject appeared in this *Journal*.³ The Toronto workers were using a somewhat impure gas, and difficulties of manufacture prevented them from obtaining enough pure gas to continue their experiments on human beings. In 1930 the Ohio Chemical and Manufacturing Company succeeded in producing a small quantity of pure cyclopropane for clinical investigation. It is unfortunate for Canada that anæsthetists in Toronto were not ready to undertake a trial of cyclopropane in the operating room. Credit for its clinical introduction must go to Dr. Ralph Waters, head of the very excellent Department of Anæsthesia of the University of Wisconsin, who administered it to the first human patients. Dr. Waters had previously introduced into anæsthesia the carbon dioxide absorption technique which makes possible rebreathing of any anæsthetic agent in a closed circuit. He was, therefore, able to conserve the small quantities available of the rather expensive cyclopropane, and by the summer of 1933 he felt justified in carrying out an extensive trial on several hundred patients. This first clinical report was published by Stiles, Neff, Rovenstine, and Waters in *Anæsthesia and Analgesia*, March, 1934.⁴ Since then many pharmacological and clinical studies of cyclopropane have been reported, and every paper has tended to confirm the first favourable findings of Henderson and Lucas. During a visit to Madison in 1933 I was so much impressed by the superiority of cyclopropane over other anæsthetic gases that I obtained some, and on October 30, 1933, I had the privilege of administering the first cyclopropane in Canada.⁵ Since then I have personally administered the gas over 2,500 times, and at the Homœopathic Hospital of Montreal, where most of my work has been done, cyclopropane has almost completely taken the place of ether and other general anæsthetic agents. With increasing experience I get to like it better, as, I feel that it is safe, dependable, controllable, and almost universally applicable.

Cyclopropane is a saturated hydrocarbon with

the structural formula  It is the simplest

cyclic hydrocarbon, and it is chemically very stable. It is heavier than air, with a specific gravity of 1.46 and a molecular weight of 42. One ounce is equivalent to approximately 4 $\frac{1}{4}$ gallons (16 litres) of gas at atmospheric pressure. It may be liquefied at a pressure of 75 pounds per square inch, and is marketed as a compressed gas in various sizes of cylinders containing from 2 to 100 gallons. Cyclopropane is capable of producing narcosis when inhaled in a concentration as low as 4 per cent, but 10 to 15 per cent is the average concentration for deep surgical anaesthesia. It will be seen that with such concentrations there is always opportunity for the maintenance of ample oxygen supply to the patient, and herein lies undoubtedly one of its great safety factors. There is never any excuse for tissue anoxaemia which has been such a damaging concomitant of some other forms of anaesthesia. In other words, our conception of gas anaesthesia is completely reversed as between cyclopropane and nitrous oxide. With nitrous oxide we often have trouble in keeping the patient asleep and we give only enough oxygen to maintain vital requirements. With cyclopropane there is always an excess of oxygen, and we add the anaesthetic agent only in sufficient quantities to keep the patient asleep. The average amount of cyclopropane required for one hour of surgical anaesthesia in our experience, using the carbon dioxide absorption technique, has been about one and a half gallons. At the present cost of thirty cents a gallon this makes anaesthesia economical, and during the past two years we have actually reduced the cost of our anaesthesia department in spite of the increasing use of cyclopropane.

Wesley Bourne, Raginsky, and their fellow workers in the Department of Pharmacology at McGill have followed up their previous valuable studies as to the effect of anaesthetics on liver and kidney function by further studies of cyclopropane in this regard.⁶ Their reports agree with the earliest work of Henderson and Lucas and the clinical findings of Waters and his associates, that there is no harmful effect

from the use of this gas. They feel that the presence at all times of an excess of oxygen during cyclopropane anaesthesia is an added advantage over other gaseous anaesthetic agents. Cyclopropane is a powerful drug, and if given in too high concentration will produce respiratory failure and eventually cardiac arrest. There is no excuse for this to occur, and I have not observed any dangerous effect during my 2,500 administrations. Seevers and others⁷ in Madison, working with dogs, have shown that respiration may be paralyzed with concentrations of 30 to 70 per cent of cyclopropane. Electrocardiographic changes did not usually occur until after respiration had ceased, and the dogs could be quickly revived by intratracheal administration of pure oxygen after cessation of respiration. Gas samples taken at the point of respiratory arrest showed that there was still an average of 30 per cent oxygen in the mixture, so that the dog was suffering from too much cyclopropane rather than too little oxygen.

Our experience with cyclopropane has shown that it can be used in almost every type of patient and for all kinds of operations. The superiority of cyclopropane rests, I believe, in the unquestionably smoother post-operative course of the patients to whom it is administered, and on the comparative freedom from complications. Nausea occurs in about the same proportion of cases as with nitrous oxide, and persistent vomiting is very seldom seen. Cyclopropane provides adequate muscular relaxation for abdominal surgery, and I have not yet met a patient who could not be anaesthetized with this agent. Our preliminary medication for the average patient is either a small dose of avertin (tribromethyl alcohol), or one and a half to three grains of nembutal (pentobarbital sodium), with or without morphine and atropine. I prefer avertin where it can be conveniently used, as the patients like the pleasant induction and gradual awakening, and I believe every effort which is consistent with safety should be made to remove the terrifying aspects of surgery. The patient, and sometimes the surgeon, is inclined to give the credit for smooth anaesthesia and comfortable post-operative course to the avertin, but the real agent is cyclopropane, not avertin, and just as deep anaesthesia can be maintained with cyclopro-

pane alone when this is necessary. As our experience increases, we find we practically never have to add ether to the anæsthetic mixture to secure relaxation, even in operations upon the upper abdomen. Induction of anæsthesia with cyclopropane takes three or four minutes, and to me it is so much more pleasant than nitrous oxide that we never use nitrous oxide for the induction of cyclopropane anæsthesia.

Cyclopropane can be satisfactorily administered by the endotracheal method, and has been so used in over 500 of the cases in our series. Thus a quiet relaxed throat with free airway and adequate oxygenation for tonsil operations may be secured, and safe anæsthesia for any operations about the head and neck and in any cases where respiratory obstruction may be anticipated.

I have not had much opportunity to use cyclopropane for brain or thoracic surgery but it is being used with satisfaction for such cases at the University of Wisconsin, at the Lahey Clinic, at Bellevue in New York,⁸ at the Mayo Clinic, and at other recognized centres of surgical progress. I am told that the surgeons find the excellent oxygenation and quiet breathing of cyclopropane anæsthesia to be a distinct advantage. Certainly in these types of cases an anæsthetic agent which is so completely controllable as cyclopropane is to be preferred to any irrecoverable drug.

Cyclopropane is applicable to the extremes of youth and age. The patients in our series were of all ages from seven days to ninety years. We have been particularly impressed by the advantage of cyclopropane over ether in operations upon very small babies. Since cyclopropane is not a respiratory irritant there is none of the excess secretion of mucus which ether induces.

Very early in our experience with cyclopropane we began to see that it had a useful place in operative obstetrics. In July, 1934, Wesley Bourne reported in *The Lancet*⁹ the favourable results of his use of cyclopropane in 34 obstetrical cases. In our hospital we have now used this agent in over 400 deliveries, including one hundred Cæsarean sections, and our results entirely confirm Dr. Bourne's findings. Good oxygenation during anæsthesia and a tonic effect of cyclopropane on the uterus have rendered the post-partum course of our

patients unusually comfortable. There has been little post-partum bleeding, and remarkable freedom from abdominal distension. Recently Dr. George Morgan, Dr. S. G. Eaman and I undertook a comparative study of the post-operative course of the last 200 Cæsarean section cases at the Homœopathic Hospital.¹⁰ One hundred of these cases had cyclopropane and the other hundred various other types of anæsthesia, mostly ethylene and ether. We examined particularly the incidence of post-operative abdominal distension and vomiting, as these are complications which seemed to be specially common following Cæsarean section. The figures we obtained from a careful study of the patients' charts bear out in a remarkable way our clinical impression that the cyclopropane patients run a smoother course. Severe abdominal distension occurred in 24 of the ethylene-ether cases, with 7 of these cases going on to real paralytic ileus. There were only 2 cases of severe distension in the 100 cyclopropane patients, and not one case of ileus. The anæsthetic agent was the only factor which had really changed in the two series.

Whether there is more bleeding during operations under cyclopropane is a disputed point. I can only say that the many surgeons who now use cyclopropane as a routine agent do not complain about excessive bleeding. I feel I cannot do better than quote the observations of Waters in this regard. In a report in the *Journal of the American Medical Association*¹¹ he says, "The amount of bleeding from the capillary bed during operations is of interest to the surgeon and difficult to evaluate. Every new agent is subject to criticism from this angle. Some work has been done showing that other factors such as oxygen or carbon dioxide content of the blood are more important than the anæsthetic agent in influencing wound bleeding. Of nine surgeons working in a routine manner with cyclopropane at Wisconsin General Hospital during the past year one is positive that more wound bleeding occurs. No such comment has been offered from the other eight. On several occasions the comment from the one source has been offered that bleeding was excessive when the agent was ether or nitrous oxide but believed to be cyclopropane. Observations of coagulation time before, during

the second half of cyclopropane anaesthesia, and one hour following have been made by the capillary tube method. No significant change was noted in 21 cases observed."

Another objection which has been raised to the use of cyclopropane is that it is explosive when mixed with oxygen or air in certain proportions and, therefore, dangerous. Most of those who raise this question are surgeons and anaesthetists who are working daily with mixtures of ether and nitrous oxide-oxygen which are just as explosive as cyclopropane or ethylene. Indeed, more fatal explosions have occurred from ether than from all other anaesthetic agents combined. Cyclopropane is almost always used in a closed circuit, so that practically none of the gas escapes into the operating room, and it would be just as difficult to cause an explosion by the use of an electric cautery or knife in the abdomen, as it would be to light the gas in one's kitchen stove by striking a match on the opposite side of the room. Most operating room explosions are caused by the presence of static electricity either inside or outside the gas machine. We know that static may be dispersed by adequate humidification, and so I believe that humidity control should be considered by all who use explosive anaesthetics, whether the agent be ether, ethylene or cyclopropane.

I have attempted to show the wide field of usefulness of this new agent. I have not intended to belittle the value of spinal anaesthesia, of the newer intravenous barbiturates, of divinyl ether or of the old stand-by, nitrous oxide-oxygen for minor surgery. Each of these drugs has its place and should be in the armamentarium of the modern anaesthetist, but I do believe that cyclopropane most nearly approaches the ideal for which John Snow was searching seventy-five years ago, and that it will be accepted with increasing thankfulness by the medical profession.

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DIFFICULTIES IN THE DIFFERENTIATION BETWEEN "ANXIETY STATES" AND HYPERTHYROIDISM*

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THYROIDECTOMY is often a necessary and most successful plan of treatment. However, we are all aware that there are a number of patients who return to us after an interval complaining of the same symptoms for which their thyroids had been removed. In the absence of a regrowth of toxic, adenomatous or hyperplastic thyroid tissue it becomes questionable whether the former diagnosis of hyperthyroidism had any foundation whatever.

In 1935 there were 18,744 admissions and readmissions to all the services of a large general

hospital. Of that number 303 patients had their thyroids removed. It is interesting to note that of all those admitted to the public wards 1.27 per cent had thyroidectomies, and of all those admitted to the private wards, 2.12 per cent had thyroidectomies. The operation is therefore not a very uncommon one and is sometimes a mistake. It is the purpose here to discuss the commonest reason for this error in diagnosis, namely, the anxiety-state being mistaken for mild hyperthyroidism. The symptoms of an anxiety-state simulate most closely those of hyperthyroidism, and it is often with the greatest difficulty that we can with certainty discard the probability of mild hyperthyroidism in a given case. How can

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we decide whether it is better to remove the thyroid or not? It is not easy. Let us discuss the elementals.

A person in ordinary health is in tune with his environment. When environmental changes take place, his organization responds with appropriate, nicely balanced adjustments. The coordinating mechanism which is responsible for this attempts to procure the best possible physiological compromise in order that his mental and physical processes shall continue to run smoothly and efficiently. This is what we mean by "feeling fit". If for any reason these adjustments are being made only with the sacrifice of comfort, then the person may be said to be ill, and the sensations and the signs of the abnormality are called "symptoms". Whether these widespread complicated adjustments are disturbed by organic disease or by functional chemical change the process is an inherently automatic one, and is carried out mainly by the autonomic nervous system. Now it happens that both in an "anxiety-state" and in true hyperthyroidism, too, this delicate mechanism is the pathway by which the symptoms are revealed. The display of symptoms cannot help but be similar, and consequently the differentiation between them may be difficult. Chronic toxæmia from infection, degeneration or new growth always upsets the autonomic nervous system, and hyperthyroidism is a chronic endogenous toxæmia. Only by carefully analyzing the characteristics and pattern of those symptoms can we obtain the distinction between a functional and an organic cause, as well as its location. In the following inventory of symptoms and signs of true hyperthyroidism notice the number of the exact words which are used by a patient with a functional nervous upset and the similarity of the symptoms.

The *symptoms* of hyperthyroidism are: increased sensory and motor irritability to which the patient gives the name "nervousness"; fatigue; tremor; tachycardia; shortness of breath; loss of weight, often with increased appetite; difficulty in sleeping; a decreased tolerance of heat; and in some cases, diarrhœa and vomiting.

The *signs* of hyperthyroidism are: tremor; tachycardia; a warm, moist skin; restlessness and an increased speed of movement; often

obvious goitre, in some cases exophthalmos and other eye signs; a decreased sugar tolerance, sometimes with glycosuria; an increased basal metabolic rate; and enlargement of the heart, depending on the duration and degree of hyperthyroidism.

When therefore, a new patient begins this familiar recitation of complaints, we feel ourselves inevitably drawn into that ordeal of extracting all the facts without prejudicing our mind too soon in favour of hyperthyroidism on the one hand, or an anxiety-neurosis on the other. Hyperthyroidism is more straightforward in its treatment than an anxiety-state. The majority of us must acknowledge that we find the many repeated hours of explanation and patient reassurance necessary to cure an anxiety-state rather a tedious and exhausting experience. Being human, therefore, we may begin our investigation with a strong hope that a mild hyperthyroidism will readily explain the symptoms in this particular patient. Doubtful cases of this kind present excellent studies in true clinical medicine, namely, diagnosis by deduction by a close analysis of symptoms, a method in which laboratory tests should play a minor rôle. Another reason for analyzing these symptoms is the fact that many of them occur as manifestations of chronic illness (fatigue, for example), and it is distinctly helpful to get more clearly in one's mind when it is that the quality of a sensation suggests an organic rather than a functional cause. Of course if an organic lesion persists long enough for lack of discovery or proper treatment, then the functional form of a particular symptom may be superimposed. However, you will be unable to entice the patient away from such a description that compels you to conclude that the cause is organic, and that the functional part is an added and secondary picture. There is probably no one so strongly constituted, either physically or psychically, that he will not finally succumb to a psychoneurotic state as an additional complication in a long continued organic illness. It then becomes a question of nice judgment as to whether the patient is actually suffering more from the initial or from the secondary illness.

The difficulty in distinguishing these two illnesses is increased because cases of hyperthyroidism do not necessarily have the com-

plete set of these symptoms and signs. The words listed above may not even include the meaning one extracts from them. We must determine, precisely, the sensation that the patient experiences when he complains of these symptoms. I shall refer to the symptom as "functional" in connection with its significance in the anxiety symptom-complex, and as "organic" when pertaining to hyperthyroidism, but applicable to many other kinds of toxæmia.

1. *Nervousness*.—Patients of both types might not have used this descriptive term for their symptom had it not been suggested to them. An original account might have been far clearer, in a patient with a good vocabulary. *Functional* nervousness is really some form of fear. It may mean the fear of crossing a street, or of crowds, or a tendency to cross bridges before coming to them, or a feeling of general perturbation when faced with any decision or unusual experience. This is mental nervousness, and the patient may have a physical trembling secondary to it. The *hyperthyroid* nervousness, or the nervousness that is due to organic disease, signifies a physical tremor on making ordinary movements, and emotional factors may not be present, unless secondarily. Annoyance and exasperation with their inability to perform voluntary muscular movements in their accustomed smoothly controlled fashion may disturb such patients greatly. This tremor may be limited to the muscles being used, or may be described as a general tremor, and often as a "trembling inside". Associated also is a great sensitivity of the special senses.

2. *Fatigue*.—This is probably one of the most important symptoms in clinical medicine and at the same time one of the most difficult to understand. *Functional* fatigue is a fatigue which is increased by resting, and that decreases as the day goes on, or when the patient does something he really likes. The patient says "I need such a lot of rest", implying that he obtains it, but you discover on close questioning that he never really gets rested. It is a fatigue of the effort of will, a course of action being too much trouble. If, from necessity, an effort is carried out and repeatedly practised the feeling of fatigue tends to wear off, much to his surprise or regret. Observing a sustained muscular action, one sees that the patient gives way morally

rather than physically, with perhaps some emotion. *Organic* fatigue, on the other hand, is seen to be a muscular local fatigue, and the outstretched limb begins to ache and sinks slowly to the ground. Hyperthyroidism has usually to be severe before this can be demonstrated. Resting always improves organic fatigue, and the fatigue increases as the day goes on. Lying down for half an hour or so may restore the ability to work for another two hours. The effect of the abnormal thyroid secretion is on muscle cells themselves, and any work on their part begins 30 to 50 per cent above their normal base line, and so an uncomfortable level of lactic acid formation is sooner reached.

3. *Disturbed sleep*.—The previous or normal sleep habit of the patient should be carefully ascertained for comparison. In the functional case the patient may or may not go to sleep easily. His description of the reason for not falling to sleep is that thoughts go around and around in his head. If he gets to sleep he wakes up frequently during the night, tossing restlessly for hours, only to fall asleep at eight in the morning and be only too willing to sleep until eleven. The hyperthyroid often has difficulty in getting to sleep, but it is not because his mind is going around and around, but because of the multitude of somatic sensations which denote the continuation of the output of energy long after all voluntary initiation of the effort has ceased. This may take two or three hours to quiet down, and, once off to sleep, he will sleep soundly for hours and waken much refreshed. Even if the hyperthyroidism is severe enough to prevent any sleep, yet the rest in bed will produce some feeling of benefit in the morning.

4. *Tremor*.—The *functional* non-hyperthyroid patient has an erratic tremor, sometimes so coarse as to be a wobble, as well as a vibratory tremor of varying amplitude. It may be unilaterally greater, and present or absent on short notice. It may disappear entirely and suddenly on relaxation. The *hyperthyroid* tremor is a fine, vibratory tremor, often felt better than seen; sometimes absent, it is true, but it fades slowly and is better after resting.

5. *Tachycardia*.—In the functional case the patient complains of palpitation, but this does not necessarily signify tachycardia. The pulse rate frequently, and in the course of the day,

usually, reaches normal at some time or another. If a week's chart of the pulse rate is studied normal readings will be seen to be recorded nearly as often as the high rates, and, of course, there is never auricular fibrillation. The hyperthyroid has a consistent rather than an intermittent tachycardia, but frequently has no palpitation. An important point is the fact that gradual enlargement of the heart occurs in hyperthyroidism, but not in functional upsets.

6. *Shortness of breath.*—Functional dyspnoea is not confined to exertion for its production. In the disordered action of the heart group of patients we are familiar with this symptom and that of the inconstant tachycardia and palpitation. Excitement and fear incite this shortness of breath, and on some days not even exertion will cause it. An apparent inability to get to the bottom of their lungs is the sensation experienced by the patients, or they may mean an abnormal desire to sigh. The hyperthyroid patient means that only on exertion does he seem to become dyspnoeic. This is more impressive if the hyperthyroidism has been rather sudden in onset.

7. *Heat intolerance.*—This question leads us on to dangerous ground by suggestion. Functional patients do not regulate their bodily temperature as smoothly as the normal, and are often intolerant of heat, and just as much of cold. Their hands are often moist, but cold, but the hyperthyroid's are rather constantly moist and warm. The functional patient means that he perspires easily on excitement or exertion. On attempting to relieve it he as quickly becomes chilly, and these wide swings of his unevenly controlled autonomic nervous system are typical. The hyperthyroid does not become chilly when he throws off the bedclothes and opens the window. However, his heat intolerance may only be present for a few hours of the day, unless the condition is severe.

8. *Appetite.*—Functional patients usually have poor appetites, but may describe them as excellent, and yet they are losing weight. On questioning you find this is true, but they may neglect to state that after a few mouthfuls they are completely and comfortably satisfied and can eat no more. As a contrast, the hyperthyroid has an increased capacity, though when

more severely affected may lose his appetite, feel nauseated, and vomit.

Among the objective findings in these problems, an *obvious goitre* is at least something definite—even in functional cases. No doubt many warning fingers of tactful friends have been pointed to it as a likely cause of trouble! The truth is, of course, that there are enormous numbers of people with adenomatous and colloid goitres who are not suffering at all from an abnormal thyroid function. We must be cautious in our judgment regarding purely anatomical defects. It is difficult to resist a hasty conclusion that physiological defects necessarily accompany this anatomical change. There are no shortcuts to the diagnosis and cure of patients. On the other hand there is a small percentage of cases of true hyperthyroidism in which it is difficult to be sure of any abnormality in the thyroid gland by palpation. Also, the histological appearance of thyroid glands may bear no relation to the clinical picture. As regards the eye signs, one need only point out that many people have prominent eye-balls or eye-balls of unequal size which can be mistaken for true exophthalmos, and that some patients have wide lid-slits which may be of the nature of a mannerism and tend to mislead us.

In the estimation of the metabolic rate there may be fallacies. Especially is this true in functional cases. If you are your own technician you may soon suspect that this subject is suffering from a functional illness; his difficulty in getting used to the mouthpiece, his fear of suffocation, and his erratic breathing which makes large and small excursions on your graphic record (if you use the oxygen method) are so different from what you find in a true hyperthyroid patient. In some people the nose clip may upset normal respiration completely. The Douglas bag and gas analysis method is much to be preferred in these doubtful people. Also, because of the very nature of their illness, it is exceedingly difficult to obtain and recognize a basal state. Apprehension with increased muscular tension and tremor will raise the oxygen consumption 15 to 25 per cent, and the technician may be convinced that there is good relaxation. Repeated tests often show these fallacies, but in some patients one can never get the reading quite within normal limits. Sedatives the day and night before will often be of

assistance. We must beware, too, of the tendency to be heavily impressed with any elaborate laboratory test and figures, even though they seem to be at variance with our clinical judgment. A trial of Lugol's solution may help considerably, provided we allow a control period beforehand.

The sugar tolerance is a mechanism intimately bound up with autonomic functions, and in cases of anxiety neurosis may be considerably altered in either direction. Over a period of months or years unusual blood sugar curves are frequently found and vary widely. This is interesting as being a demonstration of an actual chemical alteration large enough to be measured in what we understand to be truly functional disorders.

In conclusion, the diagnosis of mild hyperthyroidism must rest on; a physical nervousness; a fine, but not necessarily constant, tremor; a persistent objective tachycardia; an increased food capacity and intake, with loss of weight; true intolerance of heat; fatigue that improves with rest; an increased basal metabolic rate which has been checked, with or without a palpable abnormality of the thyroid gland—these, of course, in the absence of fever or signs of chronic infection or toxæmia, and especially with the absence of any history of an unstable nervous personality. If the cause of anxiety is chronic the patient's symptoms may be chronic, and he will complain of his somatic symptoms but not of his psychic symptoms, being unaware of the relationship.

Anyhow he is inclined to consider his psychic symptoms as necessarily a private and personal affair, whereas his body is more or less on public view, and no one feels embarrassed in discussing it. There are cases of true hyperthyroidism which have definitely begun after a severe psychic shock. In my experience these do not long remain mild and there may be no history of previous psychological instability.

The diagnosis of these very puzzling cases rests on a most careful history of the entire patient, and a careful analysis of symptoms in order to translate their true meaning. Even when there is an organic basis for disease, there is always a blending of physical and mental symptoms.

This plea for careful history-taking is, of course, a very old one, and while we agree in theory we do not actually live up to it. Of the many mistakes made in diagnosis, we find afterwards that the clue was really in the history all the time, but hurry and jumping to conclusions had successfully buried it. One's personal culture never ceases; it either deteriorates or progresses, and deterioration is easier. Our medical education is improved more by making a diagnosis as nearly as possible from the history alone, than by physical examination and the more elaborate laboratory tests, including the x-ray. These, of course, must be done, but on the principle that they are necessary, first, to confirm the diagnosis, or, secondly, to change it entirely, but not, initially, to make it.

HISTAMINE IN NASAL POLYPI.—C. C. Buhrmester and W. F. Wenner assume that oedematous polypi are always allergic in origin. Histamine is involved in the allergic phenomena and therefore also in the production of polypoid tissue. The authors undertook a comparative analysis of nasal polypi and normal mucous membrane in order to ascertain whether histamine appeared in greater quantities in polypoid tissue than in normal mucous membrane. Histamine or a histamine-like substance has been found to be widely distributed in mammalian tissue; it is present in the lymph and blood stream after anaphylactic shock. The biological test for it is made on the anesthetized atropinized male cat. The extracts from nasal polypi always produced a fall in blood pressure. This fall, expressed as histamine

equivalent, shows that polypoid tissue contains from 3.6 to 10.2 mg. of histamine-like substance per kilo of moist tissue. The extract of nasal secretions in allergic rhinitis caused a slight fall in blood pressure, much less than that caused by an equivalent extract of polypi. Histamine is probably absent from the mucin of nasal secretions, and the small amount of depressor activity is due to the proteoses formed during hydrolysis. Normal mucous membrane of the nose contains approximately the same amount of histamine-like substance as the moist polypoid tissue. But calculated on the basis of the dry weight of the tissues nasal polypi contain more histamine than the normal mucous membrane of the nose.—*Arch. Otolaryng.*, Chicago, Nov., 1936, p. 570. Abs. in *Brit. M. J.*

THE FREEZING OF HUMAN MILK AS A MEANS OF PRESERVATION

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PREMATURE babies are very frail. The course of labour and the type of delivery play important rôles in the essential result. Of equal importance is the post-partum care, and this point cannot be over-emphasized.

For a period of two years a concentrated effort has been made in the Royal Victoria Montreal Maternity to lower the mortality rate in premature infants. We are all agreed that three main factors should be stressed: (1) meticulous case-room care; (2) intelligent nursing and medical treatment; (3) adequate and proper feedings.

1. It has been proved that 80 per cent of all deaths of premature infants occur within the first forty-eight hours. Many of these can be attributed to the treatment received during labour or during the first few minutes of life. Proper management of the labour and of the delivery is essential; all should be prearranged to diminish the handling of the baby post partum. A heated incubator is placed in the case-room when the patient begins labour. In this way the baby's body temperature is maintained at a normal level during the crucial first twenty-four hours of life.

2. General nursing and medical supervision is of prime importance. The pædiatrists have paid special attention to prophylaxis against infection. All nurses and doctors in attendance must have a throat culture which is reported negative for pathogenic organisms. While examining or caring for the infant the individual is gowned, masked, and wears sterile rubber gloves.

3. Feeding is very important relative to the method of administration, and also with regard to the ingredients used. The great importance of giving breast milk to premature babies has always been stressed in this hospital. Due to the fact that all mothers have no natural supply for the first few days and many are unable to nurse at any time it is necessary to have some outside source of supply. For several years wet nurses were employed, but this method did

not always prove satisfactory. The need of having an adequate supply of breast milk, no matter how great the demand, caused us to investigate procedures carried out in other centres. Our present method was suggested by that used in Boston. To our knowledge this is the first time that a frozen human milk clinic has been operated in Canada. This department has been organized and is managed by the Superintendent of the Royal Victoria Montreal Maternity.

METHOD USED IN THE ROYAL VICTORIA HOSPITAL
SINCE APRIL, 1936

There are three stages:—(1) collection of the milk; (2) pooling and boiling; (3) instantaneous freezing.

The milk is collected from our own clinic patients who have an over-supply of milk. All subjects are thoroughly examined, especially for any signs of tuberculosis. The blood Wassermann test must be negative. Each day all milk is pooled and then boiled for three minutes. A sample of the pooled milk is sent for bacteriological examination. If the milk is to be used within a few hours it is put up in individual bottles, sent to the ward, and kept in the refrigerator until needed. The surplus is frozen and is stored as described.

Freezing.—Two rectangular plates of aluminium fit exactly on a square of dry ice measuring 10 inches by 10 inches by 2½ inches. Each plate has ten shallow depressions, each having a capacity of one-fifth of an ounce. When the plates are first put in position they vibrate for a few minutes. The depressions are then filled with milk. In about three minutes a clicking sound is heard; this indicates that the milk is frozen and each wafer spontaneously frees itself from the depression. The wafers are then transferred into a sterile preserving jar. Six ounces or thirty pellets are kept in each jar, and these are stored in a special refrigerator at a temperature of 10° below zero.

It has been proved that there is very little change in the composition of the milk. When there is a demand it is easily thawed and then brought to the required temperature. Every two weeks a sample of our frozen product is forwarded for bacteriological examination. It is interesting to note that in frozen milk the bacteriological count becomes lower from week to week.

We have collected data of all our premature babies born in this hospital over a period of three years. Every baby which was born alive, under 2,000 grams in weight and of a viable age (28 to 37 weeks maturity), is included. The smallest weighed 791 grams and the largest 1,970 grams, with an average for all babies of 1,670 grams.

gated day and night to watch and feed each small baby until the critical period is over. And we cannot emphasize too much the part played by human breast milk in daily feeding. The results charted are convincing.

We have at the present time a reserve of 500 ounces of breast milk. This enables us to look after any of our infants who need this extra diet. In addition, we now hope to aid any outside cases who, for some reason or other, are unable to procure this very precious essential to human life.

NOTE.—For the many courtesies extended we wish to thank the management of the Eastern Dairies Limited, and especially Dr. A. R. M. MacLean who offered many helpful suggestions and whose laboratory has willingly made the many different tests as well as the routine bacteriological examinations.

PREMATURITY CHART

Type of feeding	Year	No. of cases	Fetal mortality	
			No.	Percentage
All or part breast.....	1934	25	5	20.0
Artificial feeding	"	12	8	75.0
Died 1st 24 hours.....	"	5	5	100.0
(Above cases combined). Average wt. 1,690 grams		42	19	45.2
All or part breast.....	1935	24	1	4.0
Artificial feeding	"	12	3	25.0
Died 1st 24 hours.....	"	3	3	100.0
(Above cases combined). Average wt. 1,645 grams		39	7	17.9
All or part breast (January to December) ..	1936	43	6	13.9
All breast milk (April to December)	"	39	4	10.0
Died 1st 24 hours.....	"	0	0	
Average wt. 1,675 grams.....		82	10	0

Many factors have aided this remarkable reduction of mortality in these premature infants. The improved general technique, already mentioned, has played an important rôle. Regardless of expense, one special nurse is dele-

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MOUNTAIN AIR.—F. Hamburger states that, although no specific reasons can be given, an altitude of 1,800 to 3,000 feet has an undoubted beneficial effect in the treatment of many diseases of children. Whether this is due to fresh air, ultra-violet radiation, or the difference in diurnal and nocturnal temperature is unknown. He believes that the psychic effect is important. Joy increases muscle tone and appetite. Thus sunshine, fresh air, and joy, which are lacking in the child's ordinary environment, are factors contributing to his health in a higher altitude. Hamburger is convinced that most of the catarrhal diseases are not due to "catching cold", but to infection when resistance is lowered through the unnatural "room-life"

of modern civilization. He advocates mountain air for nearly all forms of tuberculosis, with the exception of the acute miliary type. Children who have apparently recovered from tuberculosis should be sent to a higher altitude for a few weeks for two successive winters. Mountain air is beneficial in the treatment of all catarrhal conditions of the upper air passages, of children with acute or chronic swollen glands of the neck, and of those with anæmia and psychic disorders. It is contraindicated in rheumatic conditions. The author pleads, in view of the known importance of natural resistance to infection, for longer winter holidays.—*Wien. klin. Woch.*, Jan. 8, 1937, p. 17.

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THE MORTALITY FROM APPENDICITIS IN ALBERTA*

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THE main portion of this study is concerned with the mortality from appendicitis in Alberta, together with a reference to our own work in Lamont.

In September, 1914, Murphy¹ in addressing his clinic group regarding acute appendicitis said,

"When we come right down to a heart to heart talk about appendicitis the grim fact which we must admit is that we are still losing too many cases. We, the members of the profession are responsible; there is no use denying it. The facts concerning the symptomatology, cause, and the results of treatment have been thoroughly established in many clinics, and on a multitude of patients. A physician today has no right to hold an opinion about appendicitis radically at variance with established practice, based on a personal series of only 5, 10, 20, or even 100 cases. So many able surgeons with well organized clinics have handled and studied exhaustively thousands of cases that a man must be either a transcendent genius or an egotist who dares oppose the present established views in terms other than these of numbers."

In 1936 are these words of Murphy's obsolete, or are they still applicable to us, the members of the medical profession here and elsewhere? The contents of this paper may help us in arriving at a conclusion. There is no one who is interested in the problem of appendicitis but knows that the death rate in 1914 and the death rate in 1936 are very different. In 1914 F. F. Burghard² in his *System of Operative Surgery* devotes several pages to the mortality in appendicitis. He quotes post-operative death rates from a fraction of 1 per cent in interval cases to 50 per cent or more in patients operated upon after the second day. It is safe to say that the average mortality for all types in 1914 was 15 to 20 per cent. Several authors call attention to the particularly high death rate in children.

Between 1914 and 1920 the mortality rate took a decided drop. This was due in part to a more general acceptance of "the early operative" plea of the leaders in surgery. Such men

as Murphy³ had insisted on the need of early surgical interference for years. This is evidenced by his following words, "We can only repeat now what we said in 1889, when we wrote our first article on lesions of the appendix, namely, that the time for operation was now! and 'now' meant within the first few hours of the attack." In addition, the importance of fluids was recognized, and intravenous and interstitial therapy began to be a routine post-operative procedure. Sodium bicarbonate first appeared to combat the acidosis from which many of the younger patients died. This was followed by increased amounts of normal saline, which in some clinics was further improved by giving it in the form of Ringer's solution. Somewhat later the tremendous importance of dextrose was recognized, and many patients who otherwise would have died were saved by the giving of water and sugar.

In 1926 we⁴ presented a paper before this Association which was a study of the mortality in appendicitis over a five-year period. In 1921, when this study was begun, MacLaren⁵ reported a general mortality of 5.09 per cent with over 7 per cent in the acute cases, although Kennedy,⁶ in a statistical report of several hospitals in greater New York, reported the mortality to be about 16 per cent. Again, if one may be permitted to make a general statement, the mortality from appendicitis for all cases in 1921 was 5 to 7 per cent, with occasionally much higher rates reported.

It is rather disconcerting in 1936 to find that there is little improvement in the last ten or fifteen years. Wevill and Wallace⁷ in their statistical survey make this statement, "It is well recognized that the total number of deaths has not varied significantly within the last ten years; the figures of the Registrar-General show this to be beyond dispute." Stanton,⁸ in reviewing recent literature in 1934, reporting on 4,692 cases, gives a general mortality rate of 5.2 per cent. Gurd,⁹ of Montreal, reporting in

* Read at the Convention of the Canadian Medical Association, Alberta Division, at Calgary, September, 1936.

1932, gives the following table which deals with various periods between 1925 and 1932, but all the figures are comparatively recent.

TABLE I.

APPENDICITIS — SURGICAL MORTALITY PERCENTAGE BY 35 REPORTERS IN CURRENT LITERATURE SINCE 1925. 70,619 CASES REPORTED.

	Mortality percentage		
	Low	High	Average
(a) General	1.22	10.00	4.05
(b) Acute	0.00	11.40	4.05
(c) Chronic	0.00	4.80	1.37
(d) Suppurative ...	0.00	13.50	5.56
(e) Gangrenous	0.00	33.00	15.40
(f) Peritonitis	8.20	16.70	11.10

In 1933 Lincoln,¹⁰ of Calgary, speaking to this organization, reported 598 cases with 7 deaths, a mortality rate of 1.10 per cent, and in conclusion stated that he and his associates believe it possible to treat surgically all acute appendicitis with a mortality of about 1 per cent. Lincoln's figures are the best quoted, but it is evident that the mortality rate from appendicitis in most clinics is much higher than his. This warrants a further serious consideration of appendicitis, that corner lot in the field of surgery which to young surgeons appears as a garden from which they may reap 30 or 60 or 100 "prosperity units", while to their older colleagues it is still a field requiring careful cultivation and the removal of many rocks.

We turn now to the consideration of our own province, and later to our personal results.

The figures for deaths from appendicitis, operative and non-operative, during the years 1921 to 1935 inclusive, were obtained from the Department of Vital Statistics in Edmonton, beginning with 1921, and following through each year consecutively the number of deaths per year is as follows: 113, 126, 125, 136, 111, 138, 152, 137, 132, 137, 130, 138, 162, the average being 135. The total population during this period has naturally increased. It is given as follows: 1921, 588,454; 1926, 607,599; 1931, 731,605; 1935, 780,000, estimated. With the help of a little arithmetic one notes no definite change from 1921 to 1935, although 1935 had a higher total than the population increase would warrant. These figures appear to bear out the statement that there has been no change in the mortality rate from appendicitis in the last decade.

Dr. Braithwaite, Inspector of Hospitals in Alberta, has kindly obtained the following figures for us. Statistics are tedious in themselves but the number of deaths after operation over the last nine years is enlightening.

TABLE II.

Year	No. of operations	Deaths	Percentage
1927	3,238	69	2.13
1928	2,986	100	3.34
1929	4,283	167	3.89
1930	4,791	120	2.71
1931	4,402	52	1.18
1932	4,087	32	0.77
1933	3,557	87	2.44
1934	5,435	91	1.67
1935	6,169	103	1.66

These figures from the Government Statistical Departments might be criticized by some as often being compiled by persons not medically trained, and hence there might be some discrepancies from a strictly scientific standpoint. This may be granted, but there is no doubt that they serve as a reliable index to the mortality from appendicitis in the province, and, comparatively, they are very satisfactory, although evidence of improvement in the more recent years is not very apparent.

Have we reached the irreducible minimum in the mortality from appendicitis? Let us hope not. Wilkie¹¹ says, "The public, therefore, has a right to expect a falling death rate in a malady which lends itself conspicuously to cure by surgery". Doerfler¹² points out that a number of patients with appendicitis will die after operation because of complications at times extremely hard to prevent, sub-diaphragmatic difficulties from infected lymph channels, occasional difficult emergency operations in the hands of inexperienced surgeons, portal thrombosis, cardiac embolism, and pulmonary embolism from a phlebitis of the large thigh veins.

Over a seven-year period the percentage of post-operative deaths from appendicitis in approved hospitals and those not approved is 2.09 and 2.58 per cent, respectively.

Our own results at Lamont Public Hospital have been reviewed at the end of each five-year period. The first group reported to this Association in September, 1926, showed the following figures:

TABLE III.

	No. of operations	Deaths	Mortality percentage
Acute, non-perforative	111	0	—
Acute, perforative with local peritonitis, including pelvic	53	0	—
Perforative general peritonitis	19	2	10.52
Interval operations	62	1	1.61
Number of cases operated upon	245		
Number of deaths.....	3		
Percentage mortality	1.22		

From 1926 to 1931 the cases gave these results.

TABLE IV.

	No. of operations	Deaths	Mortality percentage
Acute, non-perforative	113	1	0.88
Acute, perforative with local peritonitis including pelvic	58	0	—
Perforative general peritonitis	20	2	10.00
Interval operations	106	1	0.94
Number of cases operated upon	297		
Number of deaths.....	4		
Percentage mortality	1.34		

The last group, complete to July 31, 1936, is as follows.

TABLE V.

	No. of operations	Deaths	Mortality percentage
Acute, non-perforative	63	1	1.58
Acute, perforative with local peritonitis, including pelvic	104	2	1.92
Perforative general peritonitis	29	2	6.20
Interval operations	210	0	—
Number of cases operated upon	406		
Number of deaths.....	5		
Percentage mortality	1.23		

These figures are given in this manner to show the small amount of variation from period to period. This is in keeping with the statement above calling attention to the fact that there is little evidence of improvement in mortality from appendicitis during the last ten or fifteen years.

Our results summarized are as follows.

TABLE VI.

	No. of operations	Deaths	Mortality percentage
Acute, non-perforative	287	2	0.69
Acute, perforative with local peritonitis, including pelvic	215	2	0.93
Perforative general peritonitis	68	6	8.80
Chronic or interval.....	378	2	0.52
Total	948	12	1.26

We have had 12 deaths in our series, and, in reviewing them, we find 6 of the patients had general peritonitis when operated upon, and 2 others developed it following operation in cases of perforative appendicitis with local peritonitis. Wherein can we improve upon our methods in handling these cases? To begin with all cases of appendicitis should be seen and treated long before the general peritonitis stage. The fault here is not always with the surgeon. To quote Wilkie¹¹ again, "Operation after perforation has occurred is but an inadequate effort to repair the evil results which have been caused by delay or mismanagement". The problem is largely one of educating the laity still further with regard to the possible seriousness of abdominal pain, the consignment of most purgatives to the garbage barrel, and the early seeking of medical advice if the acute abdominal condition is not rapidly subsiding. Until this education is still more thorough we are going to see these cases of general peritonitis. How shall we handle them? Shall we operate or not? Not immediately on all. MacGregor, of Hamilton, would probably advise operation on very few during the attack under consideration. He would treat them with the best supportive measures, and open the abscess when it localized and failed to resolve. Graham,¹³ in speaking before the Ontario Medical Association at Fort William last year, said, "The fact that the mortality from acute appendicitis in the United States and Canada is steadily rising is conclusive evidence that we are failing in the treatment of this disease". And again, "It is surely much less disastrous to remove a normal appendix than to wait until perforation occurs, with its attendant mortality of 17 per cent". To quote a third statement from the paper, "We thus believe that no patient who suffers an acute appendicitis and who develops a mass in the right iliac fossa is ever a candidate for an emergency operation". He is a candidate for operation, but as an elective procedure at the discretion of the surgeon and after proper preparation.

Contrary to the above rather depressing statement our Alberta findings are that figures can be improved upon; the mortality rate is not rising; it is simply not improving.

Personally, after proper preparation we will continue to operate on most of the cases of

ruptured appendicitis, and then make use of the best we have in the way of post-operative treatment, interstitial, or continuous intravenous injections of dextrose and Ringer's solutions, continuous drainage of the stomach through the nasal tube, so long as there is any evidence of ileus or back-flow into the stomach.

Eternal vigilance is demanded in these cases. In 3 of the 6 cases of death from general peritonitis we had the feeling that we were a little tardy in introducing some of the more active therapeutic measures, and by tardy we mean a delay of one or two hours. If there are signs at 2.00 a.m. that the stomach is dilating, that is the time for action, not at 4.00 a.m. or when rounds are made in the morning. After operation both you and your intern must give the patient 24-hour service until the danger period is passed.

The handling of our cases in Lamont Public Hospital was outlined in detail in our article previously referred to. Our treatment is still essentially the same, except that we make more frequent use of the continuous intravenous injection for 12 to 48 hours, as is necessary in the severely ill cases. We do not hesitate to establish continuous stomach drainage through the nasal tube in cases where there is unusual vomiting or evidence of dilatation. Lastly, more of our recent cases have had spinal anaesthesia.

In an effort to further reduce the mortality from appendicitis, and with these cases of general peritonitis ever under serious consideration, we suggest the following fundamentals in the treatment of appendicitis: continued education of the public; the early establishment of a diagnosis; immediate operation on all cases not needing special pre-operative treatment; preparation with fluids and dextrose of all severely ill patients; sufficient pre-operative sedative in all cases; the use of the muscle-splitting incision

of the McBurney type; sufficient trained assistants; as much speed as is consistent with efficient work; rubber-tissue drainage in perforated cases. Since discontinuing rubber-tube drainage we have had no faecal fistulae and the drainage has been satisfactory; interstitial or intravenous therapy in all cases after operation; small doses of morphine, repeated if necessary; no. p.r.n. orders for this drug; we seldom exceed an $\frac{1}{8}$ of a grain per dose in adults; low Fowler's position; early establishment of stomach drainage per nasal tube upon the slightest indication (with this, ileostomy will probably become a thing of the past); forcing of high calorie nourishment and fluid as soon as tolerated.

These suggestions, consistently followed, lead us to predict a further definite reduction in the mortality from appendicitis in Alberta in the years immediately ahead of us.

We wish to thank Dr. L. G. Wood and members of our office staff for their assistance in the preparation of this paper.

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WASSERMANN TEST IN PREGNANCY.—T. D. Hughes and C. Gammie in routine Wassermann tests on pregnant women coming for ante-natal treatment found positive results in seven (0.47 per cent) of 1,496 primiparae and in twenty-five (1.31 per cent) of 1,908 multiparae. Of the Wassermann-positive multiparae ten had no history suggestive of syphilis and would have been missed, along with other unsuspecting cases, had the test not been done

as a routine. Anti-syphilitic treatment was instituted in the thirty-two Wassermann-positive cases, and of twenty-five of these who were followed up there were born twenty live and five dead children. Several of the children born alive had a positive Wassermann reaction. The authors emphasize the importance of the preventive aspect of the routine Wassermann reaction test in pregnancy.—*Med. J. Australia*, Dec. 5, 1936, p. 783. Abs. in *Brit. M. J.*

GERMAN MEASLES ENCEPHALOMYELITIS*

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Toronto*

GERMAN measles is looked upon as being a benign illness in which the occurrence of complications, either during the period of eruption or in that of convalescence, is almost unknown. So mild is the disease that some authorities have questioned the advisability of quarantine and other attempts at preventive measures. In recent years, however, attention has been called to the fact that involvement of the central nervous system does occur during the course of the disease, and a number of such cases have been reported in the literature of various countries.

The cases of German measles in which involvement of the central nervous system has occurred do not appear to be in any way different from the ordinary type of the disease, nor has the initial illness been unusually severe. In fact, in the majority of cases reported the initial illness has been mild or moderate in degree. There is therefore no relation between the severity of the primary illness and the involvement of the central nervous system. The age-incidence ranges from 5 years to 33. The majority of the cases have occurred in persons under 15 years of age. From two to six days after the appearance of the original rash, when the rash and all constitutional symptoms have disappeared, evidence of secondary involvement appears. This may take the form of the occurrence of a convulsion without prior warning, or the onset may be more insidious with slight rise in temperature and the appearance of vague nervous symptoms, such as slight headache or slight dizziness. The temperature may even at this stage remain normal. Where the central involvement has been ushered in by a convulsion, a very extensive disturbance of function may almost immediately be present when this occurs, though the further course may show little or no progression. On the other hand, where the onset has been less dramatic evidence of exten-

sion of involvement may continue to appear for thirty-six hours before arrest of this acute phase takes place.

Headache is usually a constant symptom. This headache is often severe and usually frontal in type. It is frequently accompanied by vomiting. An intense restlessness is also present, the patient throwing himself about in bed and often requiring actual restraint to prevent him from injuring himself. Signs of meningeal irritation may be present, but this is not constant. The temperature may remain normal throughout the course of the case, or, at most, only slightly elevated. On the other hand, it has been reported as high as 105°.

The signs of involvement of the nervous system indicate that the brain and spinal cord may be attacked at any level. In general, the cases may be grouped as: (1) cerebral, where the evidence would indicate that the cerebral hemispheres were bearing the brunt of the disease, and (2) brain-stem or spinal, where the damage is more local in distribution.

In the first or cerebral group signs of mental confusion, delirium, stupor or coma are common. Such focal signs as hemiplegia and monoplegia also occur. In the brain-stem spinal group, the signs are usually more localized. Various cranial nerve palsies have been reported, and diplopia has been described, although the occurrence of this latter sign has not been so common as in epidemic encephalitis, for the brain-stem does not appear to be any more vulnerable to the action of the virus of German measles than does any other part of the brain. Urinary retention may occur and deep reflexes be absent. The cerebrospinal fluid usually shows some abnormality. It is frequently under increased pressure and the cell count is raised. Cell counts as high as 400 per c.mm. have been reported. Globulin is increased. The course of the disease, though dramatic, is usually of short duration, the various signs abating after a few days and complete recovery finally taking place.

* Read before the Sub-section of Neurology and Psychiatry, Academy of Medicine, Toronto, November 13, 1936.

Permanent impairment of function, though, sometimes remains.

During the epidemic in the City of Toronto in 1935, two cases of German measles encephalomyelitis were admitted to the Hospital for Sick Children.

CASE 1

(H.S.C. 78258), a boy, 12 years of age, previously healthy, on June 5th, exhibited the characteristic rash of German measles with definite enlargement and tenderness of the suboccipital lymph glands. Temperature, 99.2° F. There were no other signs or symptoms, and by the next day the rash had disappeared. On June 8th, three days after the initial appearance of the rash, the patient complained toward evening of slight headache. The following day this headache was worse and was accompanied by vague dizziness. Examination at this time did not elicit any sign in any system, although the temperature was 99.4° F. At 3.00 a.m. on June 10th the boy had a convulsion in which the motor manifestations lasted about fifteen minutes and from which he did not regain consciousness. A second convulsion occurred at 5.00 a.m., commencing on the left side of the face, then generalized. Two other convulsions occurred in rapid succession.

On admission to hospital at 7 a.m., the same day, he was deeply unconscious. Nothing abnormal was present in the heart or lungs. The pupils were widely dilated and inactive to light. The optic discs were normal. The eyes showed conjugate deviation to the right. No localized weakness was present in the face. The tongue had been bitten recently. The deep reflexes were all over-active, and plantar stimulation gave an extensor response on both sides. Temperature on admission, 101.4° F., later rising to 102.4° F.; pulse-rate, 130; respirations, 24.

The cerebrospinal fluid was under normal pressure and contained 50 cells, all lymphocytes. Pandy 2+. White cell count, 9,200; 68 per cent polymorphonuclears. Urinalysis, normal.

Later in the day, extreme restlessness became apparent; the patient rolled and tossed about in bed, putting his hands to his head and quietly moaning. June 11th.—Some improvement was evident. Though still unconscious, the pupils reacted promptly to light. June 12th.—Consciousness returned. The patient was less restless, and the temperature had subsided to 99.4° F. The deep reflexes remained over-active and plantar stimulation continued to give an extensor response on both sides. The patient was discharged from hospital on June 16th.

The outstanding feature subsequently in this case was the persistence of a memory defect. No recollection of the first four days spent in hospital was retained by the patient, and for a further period of ten days the boy was unable to recall occurrences from one day to the next. This finally cleared. The plantar reflexes remained extensor for three weeks. The boy returned to school in the fall and entered into all his former activities, and is reported by his teacher as being as alert and capable as prior to his acute illness.

CASE 2

(H.S.C. 79169) a boy, 7 years of age, was admitted to hospital on July 2nd, with the history of having been sent home from school four days previously with German measles. The attack had not been severe, for he had been permitted out to play two days later. On the day prior to admission, he had become suddenly ill, had vomited, and was delirious, and had remained confused since.

A record of previous illnesses had included chicken-pox in 1932 and simple measles, January, 1935.

On admission to hospital he was obviously ill; the face was flushed and persistent muscular twitching was present in the face and in the limbs. He appeared confused, quite unaware of his surroundings, talking irrelevantly and in a disjointed manner, and complaining of frontal headache. Nothing abnormal could be demonstrated in the heart, lungs, or gastro-intestinal systems. His attention was poor although cooperation was fair during examination. The pupils were round, equal, and active to light. The optic discs were normal. The ocular movements were full; no nystagmus. Movements of the face, tongue and palate were normal. The deep reflexes in the arms were difficult to elicit; in the legs the reflexes were brisk, though equal. Plantar stimulation gave a flexor response on both sides. His temperature on admission was 99° F., never rising above 99.6° F. The cerebrospinal fluid was under normal pressure and contained 60 cells per c.mm. (all lymphocytes). Pandy, 1+.

July 3.—Confusion was more marked, though the patient was less restless. Frontal headache continued. Confusion remained until July 5th, four days after the onset of the cerebral involvement. On this date the child became aware and interested in his surroundings. Headache had ceased, and no residual signs remained in examination of the nervous system. The cerebrospinal fluid still showed 50 cells per c.mm.

The patient was discharged from hospital on July 8th, and the subsequent history has been uneventful.

The two cases here reported were both predominantly cerebral in type. Both had followed a mild attack of German measles, and both made complete recovery.

German measles encephalomyelitis resembles very closely that following simple measles. In simple measles evidence of invasion of the central nervous system appears from 4 to 6 days after the onset of the original illness. In the case of German measles the neurological signs appeared from 2 to 6 days after the appearance of the rash. In both types, the manner of onset, the distribution of involvement, and the course of the complication are practically identical. If we except the period of onset in encephalomyelitis following vaccination, we find the manner of onset, distribution of involvement, and course of the disease the same as in measles and German measles.

This marked similarity, which is further borne out by pathological findings, immediately brings up the question whether the neurological complications occurring occasionally in the course of the various specific fever are due to the virus causing the primary illness, or whether the primary illness merely prepares the soil for some common virus which becomes active and produces a secondary disease. There is general agreement that all forms of encephalomyelitis have occurred with increased frequency during

recent years, and at present the balance of evidence would appear to favour a common agent as the causative factor.

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GUMMA OF THE HEART

(WITH REPORT OF A CASE)

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SYPHILIS of the heart, which in the majority of cases means syphilitic aortitis, is not a common form of organic heart disease, representing, as it does, only from 5 to 10 per cent of cases in the various series reported. True gumma of the heart is an even rarer condition, occurring only in a very much smaller percentage of cases of cardiovascular lues. The subject was first described in 1845 by Ricord,¹ and in the following ninety years 97 authentic cases were reported. In 1935, Sohval² reviewed the literature and added two cases which he fully described.

The usual textbook of pathology or medicine refers to the incidence of gummata of the heart as "rare", and dismisses the subject in but a few lines. Warthin³ has emphasized the importance of syphilitic fibrosis of the myocardium as being the typical end-result of the invasion of the heart muscle by the *Treponema pallidum*, and according to him gummata were rare. Cowan and Rennie,⁴ in 1921, stated that the only cases which they had seen had died while in apparently good health or during an illness other than cardiac. In 1927, Clawson and Bell⁵ reported a series of 126 cases of luetic aortitis which came to autopsy. Of these, 3 had gummata of the myocardium in addition. After a very extensive clinical survey of 10,000 syphilitics, Turner⁶, in 1930, published his results which showed the incidence of cardiovascular syphilis to be 10 per cent of all "patients who on admission to the clinic were thought to have their infection for two years or longer". Of this group, 0.5 per cent had one or other of luetic myocarditis, gummata of the heart muscle, disturbance of the conducting system, or "other rare lesions".

Localized gummatous infiltration (gumma) of the myocardium presents the same appearance and structure as in other tissues of the body. It forms a mass which is rubbery in consistence and pale in colour, and usually is surrounded by a fibrous capsule, at least in longstanding cases. The size varies considerably, some gummata being just visible to the naked eye, while others are as large as a hen's egg. The lesions may be multiple. Microscopically, the lesion

presents a central area of necrotic material with small-cell infiltration, at the periphery of which an occasional giant cell may be seen. Surrounding the whole lesion is a fibrous capsule, more or less well defined, depending on the age of the lesion. Endarteritis is a prominent feature. The site of cardiac gummata is most frequently in the myocardium, especially the basal portion of the interventricular septum. The affected area may in time spread to involve either the endocardium or pericardium, and an aneurysm of the heart may result, which may rupture, causing sudden death. On the other hand it is conceivable that the lesion may entirely heal by fibrosis, especially if early and adequate treatment be instituted.

The rarity of true gumma of the heart would seem to justify a report of the following case which we believe to be an example of localized gummatous myocarditis.

Mrs. M.H.S., aged 54, was first seen on August 16, 1935, with the following complaints.—Dyspnoea and palpitation on exertion, since 1931; anorexia and vomiting; recent non-productive cough, worse on exertion; and loss of weight (30 lbs.).

Family history.—Negative.

Personal history.—Born in England. She had an apparently normal infancy and childhood, not having had any of the usual diseases of childhood. She came to Canada in 1910, and has since resided on a small dairy and fruit farm, where she had worked hard attending to the usual household duties and helping with milking, etc. She had been married for 32 years. Her husband was living and well. One child died at 3 months of age about 30 years ago. No miscarriages.

History of present illness.—The patient first became aware of heart trouble in 1931 at the age of 50, when, because of dyspnoea and loss of weight she consulted a local doctor who found her heart affected. There was no complete examination at this time. In 1934 she developed a troublesome non-productive cough that came on with exertion and was so severe as to prevent her carrying on her usual duties. Another doctor was consulted and he advised rest and digitalis. In spite of this treatment, her condition has become progressively worse. There was no history of hæmoptysis or œdema.

Physical examination.—The patient was a poorly developed, poorly nourished woman of about the stated age. She was suffering from obvious dyspnoea, weakness, and loss of weight. Her usual weight was 140, as compared with a present weight of 106. Her height was 5 feet 2 inches. The skin was cold and dry. The lower teeth were in fair condition, and there was an upper denture. The right tonsil was enlarged and infected. The pupils were equal and reacted to light and accommodation. The thyroid showed a small nodular enlargement in the right lobe. The pulse was 100, regular in rate and rhythm; blood pressure 140/80 in both arms. The peripheral vessels were slightly thickened.

The heart was enlarged to palpation and to percussion. A systolic murmur was heard with maximum intensity along the left border of the sternum at the level of the second to the fourth ribs. The heart sounds were weak and distant, and at the apex were of tic-tac quality.

The bases of the lungs were clear, but the liver was enlarged three to four fingers' breadth below the right costal margin. Abdominal examination was otherwise negative, as was pelvic and rectal examination.

The tendon reflexes were present and equal. There was no oedema of the extremities. Ophthalmoscopic examination revealed slight retinal arteriosclerosis.

Laboratory findings.—Urine, acid; specific gravity, 1.008; albumin, a trace; sugar, a trace; microscopically, negative. Blood: Kahn test, plus 4. Blood count: erythrocytes, 4,700,000; hæmoglobin, 74 per cent; leucocytes, 6,600; polymorphonuclears, 75 per cent; lymphocytes, 25 per cent. Basal metabolic rate, plus 6 per cent. Electrocardiogram, rate 80, regular. The T-wave was inverted in all leads (probably a digitalis effect). The conduction time was prolonged, the PR interval being 0.28 seconds, while the QRS was 0.16 seconds. The low potential suggested myocardial involvement.

The x-ray of the heart showed considerable cardiac enlargement; total transverse diameter, 15.5 cm.; internal diameter of the thorax, 25 cm. There was a prominence over the left auricle and the aorta was dilated throughout.

Diagnosis.—Syphilitic aortitis, with impending congestive heart failure.

The patient was advised to have a rest of one month in hospital, and on August 17th she was admitted to the Vancouver General Hospital. On the following day she had two attacks in which she became cyanosed, dyspnoeic and stuporous for several minutes. The pulse was very slow during the attack, but afterwards became rapid and irregular. This was associated with marked restlessness which was overcome by morphine hypodermically. Later, vomiting was troublesome.

On August 19th her condition was poor. Pulse, 100; blood pressure, 90/60. In spite of complete bed rest and symptomatic measures her condition grew progressively worse. On August 22nd, she had another slight attack followed by some substernal distress. Daily administration of 50 c.c. of 50 per cent glucose intravenously seemed to produce some improvement, and she remained free of attacks until September 2nd. On that day the most severe seizure occurred, being associated with marked dyspnoea and extreme cyanosis and involuntary micturition. On September 3rd at 11.30 a.m. another severe attack occurred, this time associated with a slight generalized convulsion. The patient died at 9.35 p.m.

Autopsy was performed at 10.30 a.m. on September 4th. The notes regarding the heart are as follows. The pericardial sac is considerably dilated and contains about 100 c.c. of clear straw-coloured fluid. On opening the pericardium the heart appears definitely enlarged, and on its anterior surface in the wall of the right ventricle, immediately below the origin of the pulmonary artery, there is a raised thickened area about the size of a fifty-cent piece, yellowish grey in colour. On opening the heart this area which measures 1 cm. in thickness presents a yellowish degenerated appearance, with a geographical outline extremely suggestive of a gummatous process. This area extends along the pulmonary artery, which shows considerable thickening of its wall increasing to a point about 2 cm. beyond the pulmonary valves where the artery is practically occluded, a mere slit-like opening admitting only a fine probe remaining. The intima is scarred and wrinkled in what appears to be a typical luetic involvement. The pulmonary valves are normal. Adherent to the inner surface of the gumma on the wall of the right ventricle is a mural thrombus. The wall of the right ventricle is hypertrophied, measuring 0.8 to 1 cm. in thickness. The columnæ carneæ are markedly hypertrophied, and entangled through the trabecular surface are numerous friable masses of organized thrombi. The other valves are normal. The aorta shows extreme, extensive and typical luetic aortitis, its wall is thickened and it is dilated throughout. The mouths of the coronaries are narrowed by the aortitis, but the coronaries themselves are relatively normal. There was no coronary thrombosis and no evidence of myocardial infarction. The musculature of the left ventricle was not hypertrophied.

The examination was otherwise negative, except for the liver which showed numerous small pea- to filbert-nut-sized cysts containing watery straw-coloured fluid. These cysts were transparent. The intervening liver tissue was pale and congested but not cirrhotic. This process would appear to be a congenital one. All other organs were essentially normal.

Pathological diagnosis.—Gumma of right ventricle and pulmonary artery with stenosis of the latter; luetic aortitis; congenital cystic liver.

Sections through the mass in the right ventricle show a typical gummatous process with large irregular poorly defined masses of homogeneous pink-stained necrosis. Extending out from these areas are portions of normal myocardium. Between the necrotic and normal areas is an indefinite, rather dense, border of epithelioid cells infiltrated with lymphocytes and plasma cells. Extending peripherally into the heart muscle between and replacing the muscle fibres are patchy areas of fibrosis also infiltrated with these cells. Changes of this same order are apparent in the thickened wall of the pulmonary artery. Spirochætal stains were not done.

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THE TREATMENT OF EPIDERMOPHYTOSIS WITH FORMALIN

BY C. R. SALSBURY, M.D., C.M.

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THE number of therapeutic agents that have been advocated for the treatment of the different varieties of ringworm is so great that one hesitates to suggest another. Conversely, however, this richness of alternatives is, of itself, a good indication that no one method is outstandingly effective. This article is to recommend the local application of formalin. No attempt has been made to read all the articles in recent publications, but a search through the "Index" for several years has not disclosed any mention of its use.

Most of my experience has been with epidermophytosis of the feet. The following routine management is recommended.

1. Daily washing with warm water and a good soap, and vigorous rubbing with a coarse wash-cloth. Stockings must be changed at least once daily.

2. Low shoes should be worn whenever occupation permits, and the sandal type is to be preferred. The greater ventilation of the foot decreases the moisture between the toes, and this is an important factor in treatment.

3. Many patients first present themselves on account of interdigital fissure. Formalin is definitely contraindicated here as it is too irritating. Fold a small piece of loosely woven cloth (a 1 inch square of bandage is very satisfactory) and draw it between the toes, preferably with the fold posteriorly. Wet the pad with 20 per cent mercurochrome, using a medicine dropper. Do not bandage the foot, but hold the pad in place by the stocking alone. Every interdigital cleft should be similarly treated, even if not obviously involved. Stockings should be of the lightest possible grade and may be worn at night, if necessary. All discomfort disappears in a few minutes and the fissure usually heals within twenty-four hours. Fissured areas in other locations may be similarly treated. Continue the treatment for three or four days, then use bathing alcohol, with or without the pad. In warm weather, or if there is much sweating of the feet, the pad should be worn for long periods, but should, of course, be changed daily.

4. For the blebs. If small, superficial and not between the toes, simply apply formalin, without opening. If deep, large, or between the toes, open fully and apply 20 per cent mercurochrome. Cover with one layer of bandage or other soft white cloth, to be held in place by the stocking. Do not allow formalin to reach these areas for three or four days after opening.

5. For other definitely affected areas, formalin appears to be the most effective application. It may be put on with a medicine dropper or very fine brush. Allow to dry. Apply a second coat and again let it dry. No covering is needed. Repeat daily until the skin is hard, dry, and beginning to peel. This usually requires three to seven days. Occasionally this dry skin cracks through its full thickness. In such cases use 20 per cent mercurochrome until the fissure has healed. After desquamation watch the area for further evidence of the disease, and repeat the treatment if necessary.

6. At later stages of the treatment, when there is no fissure, bleb, or other evidence of persisting infection, one should use some antiseptic lotion, once or twice daily. I have used 1 per cent formalin in commercial rubbing alcohol, but believe this to be unnecessarily strong. As long as this is being used, the skin will be rough and scaly, and will suggest continuing infection. Its use should not be persisted in, therefore, for more than two weeks without an interval of freedom to gauge the response.

The probability of reinfection from shoes, slippers, etc., must be considered, although I do not believe it to be as serious as some would have us believe. Yandell Henderson has suggested the use of formalin vapour. I have not tried it, but in theory it seems ideal.

One typical case of *tinea circinata* and two cases of ringworm of the nails have been treated with formalin with very satisfactory response. It might be worth mentioning, also,

that one case of dermatitis venenata from poison ivy has been similarly treated. The results in this last case were particularly striking, no individual lesion persisting for as long as twenty-four hours after the first application.

Full strength formalin was used in these cases, but weaker solutions might be equally efficient. It should be remembered that formalin is credited with causing severe reactions in

susceptible persons. None were seen in this short series.

The number of cases in which I have used this method is too small to constitute a sound clinical test. Only a long series will determine its true value. This brief communication is offered in the belief that formalin is a valuable therapeutic agent and in the hope that it may receive a thorough clinical test.

A NOTE ON THE CALCIUM ASPIRIN THERAPY OF CHOREA*

BY GERTRUDE E. G. PEARSON

Children's Memorial Hospital, Montreal

FOLLOWING the appearance of an article in the *British Medical Journal* in August, 1934, describing the method and results of the treatment of chorea by calcium and aspirin, in which the author, N. Mutch concluded that chorea was related to a low level of calcium in the spinal fluid, and that the raising of the spinal fluid calcium to normal was followed by cure of the disease, observations were made on the Rheumatism Service of the Children's Memorial Hospital in an attempt to confirm these findings.

A series of 23 cases of Sydenham's chorea was followed in the hospital. The ages of the children ranged from 6 to 12 years. On admission to hospital the calcium level in the spinal fluid and the calcium in the blood were determined. The patients were then given calcium gluconate, gr. xv, and aspirin, gr. x q. 4 h., and kept on this treatment until the chorea had subsided. In the series followed this result occurred in from 2 to 4 weeks. In only one case did the chorea continue over the 4-weeks' period. When the chorea had subsided a second determination was made of the calcium level in the blood and spinal fluid, and in some cases a third and even a fourth calculation was made after the child had been off treatment for several months and had no signs of chorea. In several cases of recurrent chorea we were able to repeat the observations on the same child and compare the figures with those obtained on discharge after the previous stay in hospital.

The results obtained do not support the theory that the calcium level in the spinal fluid has

any relation to the chorea in these children, or that chorea follows when the calcium in the spinal fluid falls below a certain set figure. Our figures for the calcium level in mg. per cent during the attack of chorea varied from 2.6 to 6.4, while the blood figures ranged from 9.2 to 12.2. These same children showed a range in the calcium of the spinal fluid of from 2.8 to 6.6, and in the blood from 9 to 11.8, after they had been on calcium treatment from 2 to 4 weeks, and there were no further signs of chorea.

We then investigated the individual cases to see if each child might have a specific level of calcium in the spinal fluid peculiar to himself and that below this level chorea developed. We found that in the 23 cases followed the spinal fluid calcium in 17 cases had increased, in the remainder either dropping or remaining at the same levels. However, when treatment was discontinued for some time many of these children showed that their calcium level in the spinal fluid had dropped below the former level, with no return of chorea.

One child (A.M.) was discharged from the ward with no signs of chorea and a spinal fluid calcium of 5.6, and returned 5 months later with marked chorea, yet her spinal fluid calcium was still 5.6.

One boy (R.C.) had chorea with a spinal fluid calcium of 8.6; no chorea with spinal fluid calcium at 3.2. He was re-admitted 7 months later with chorea, the spinal fluid calcium now being 5.1 and dropping to 3.6 when the chorea had disappeared.

A girl (L.H.), brought in with chorea and a spinal fluid calcium of 4.4, was discharged cured with a spinal fluid calcium of 6, but on a check-up six months later was found to have a spinal fluid calcium of 2.8, but no signs of chorea.

A girl (G.C.) had chorea with a spinal fluid of 4.6 which rose to 6.2 under treatment. But 8 months later she had a spinal fluid calcium of 3.2, with no signs of chorea.

* From the rheumatism service of the Children's Memorial Hospital, Montreal.

A girl (M.C.) had chorea while her spinal fluid calcium was 6.4. This dropped with treatment to 4.6, although the chorea cleared up, and two months later with no signs of chorea had a further drop to 4.2.

However, in observing these cases clinically, it was concluded that this treatment materially shortened the duration of the chorea, the course running only from 2 to 4 weeks after admittance to the hospital. In two cases of very severe chorea the beneficial results of the therapy were striking within a very few days. It was felt however that this treatment was purely symptomatic, the calcium acting probably as a nerve sedative, and the salicylates probably having a beneficial effect on the rheumatic infection.

These children were kept at rest, and in addition to the calcium received cod liver oil and an iron tonic.

SUMMARY

1. Calcium and aspirin were used in 23 cases of Sydenham's chorea with marked clinical improvement and a shortening of the average duration of the chorea.

2. Spinal fluid calcium estimations in 23 cases of chorea showed that there was no minimum figure below which chorea occurred. Variations in the calcium level in the spinal fluid during

the attack of chorea were found, ranging from 2.6 to 6.4 mg. per cent after the chorea had subsided still ranging from 2.8 to 6.6.

3. With calcium and aspirin 17 cases of chorea showed an increase in the calcium of the spinal fluid, with a disappearance of the chorea; 6 cases showed a decrease in the spinal fluid calcium, also with a disappearance of the chorea. Many of the cases showing an increase later showed a decrease to the former level or below it, with no return of the chorea.

4. Some patients returned to the hospital several months after discharge with a recurrence of chorea, although the level of the spinal fluid calcium remained the same, or was higher than on discharge.

CONCLUSION

Treatment with calcium and aspirin gives good clinical results in Sydenham's chorea, but it is simply symptomatic. It has not been shown that the chorea is associated with a low level of calcium in the spinal fluid or can be correlated to this level. It has not been shown that the good effects of this calcium treatment are due to the raising of the level of the spinal fluid calcium.

Case Reports

A CASE OF PHARYNGO-ŒSOPHAGEAL DIVERTICULUM

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F.R.C.S.(C.)

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The relatively uncommon incidence of œsophageal diverticula in ordinary surgical practice explains the frequency with which the diagnosis of this condition is overlooked. The very gratifying result of treatment as reported by various observers merits a review of its symptomatology and management, which cannot be better accomplished than to cite the following typical case which came under my observation.

CASE REPORT

F.K., male, aged 62 years, was admitted to hospital on November 14, 1935. An intelligent farmer, who had previously enjoyed good health, he was complaining of difficulty in swallowing. The earliest recognition of his illness dated back 12 years, when he was first aware of a discomfort in his throat following meals. In the

interval that followed this discomfort became marked and progressed gradually to a point at which he had often experienced a choking sensation after meals. Not infrequently he would regurgitate solid food ingested sometimes twelve to sixteen hours previously. Before retiring he acquired the habit of expelling food voluntarily which had accumulated during the day, so that he would be assured of a comfortable rest. He remarked on the unusually loud gurgling and splashing sounds accompanying deglutition. However, his appetite, nutritional state, and general feeling of well-being were unaffected, hence his delay in seeking medical advice.

Aside from having recently had a left inguinal herniorrhaphy, the other details of the history are not pertinent. The patient was of muscular build and presented a normal healthy appearance. His colour was good; weight 165 pounds.

On admission there was a fullness in the left side of his neck, more marked after drinking water. This was compressible, with resulting gurgling sounds. A moderate sclerosis of the radial arteries was present. Blood pressure 136/80; hæmoglobin, 75 per cent; red blood cells, 3.6 millions per c.mm. Roentgen-ray examination following the ingestion of barium gave findings that may be seen in Fig. 2. This may be compared with a plate taken two years previously (Fig. 1), which was kindly sent to me on request. It will be seen that the increase in the size of the diverticulum during the interval was considerable. Fluoroscopic examination was done, which offered a means of determining the details of the posi-

tion of the sac and its communication with the œsophagus. The deviation of the barium into the sac occurred at the level of the 6th cervical vertebra, and extended to the fundus opposite the 3rd dorsal vertebra, lying posterior to the œsophagus and to the left, roughly circular in outline.

Preparation for operation consisted in intravenous infusions of glucose-saline solution and frequent mouth-washes. The patient was encouraged to drink plenty of water in order to wash out the sac and to build up his fluid reserve. Forced or artificial feeding were not thought necessary with the general condition of the patient as favourable as it was. The surgical plan fol-

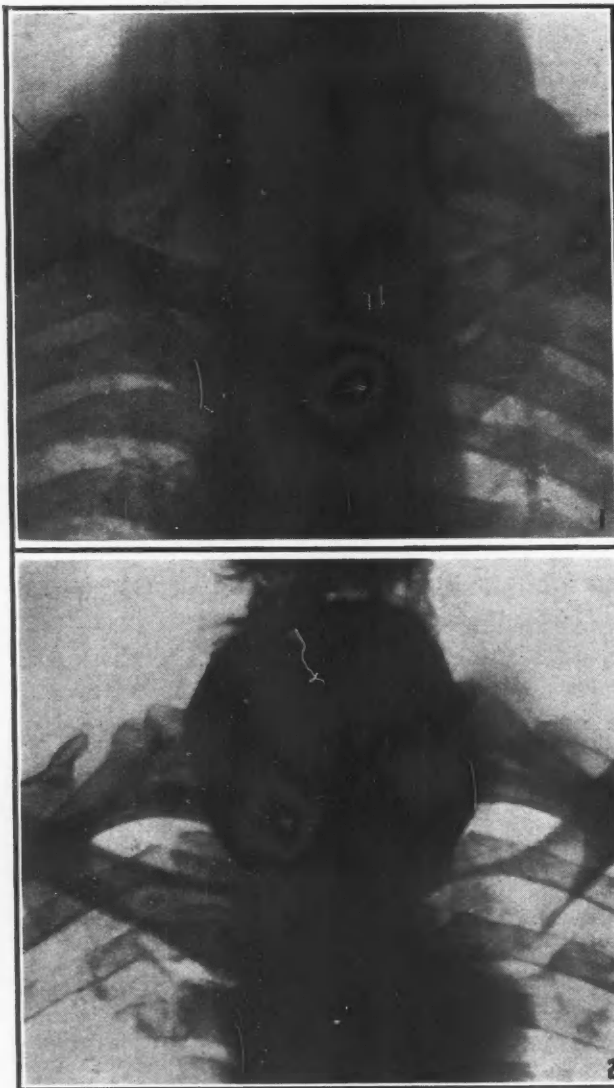


Fig. 1.—Taken two years before operation. Compare with Fig. 2. Fig. 2.—Taken at time of operation.

lowed the method described by Lahey, the so-called two-stage operation.

Under local anaesthesia (5 per cent procaine hydrochloride) a three-inch incision was made along the anterior border of the left sternocleidomastoid muscle, midway along its length. The left lobe of the thyroid gland and the deep cervical vessels were exposed by blunt dissection. The diverticulum was visualized and isolated, after ligating the superior and inferior thyroid vessels and retracting the thyroid gland and prethyroid muscles medially, and the great vessels and sternothyroid muscle laterally. The fundus of the sac was secured and separated to its neck, by blunt dissection, thereby bringing it to the surface of the wound. The

sac was of moderately tough fibrous nature, three inches long, and communicated with the œsophagus at the level of the cricoid cartilage by an opening which appeared to be sufficiently wide to allow the entrance of two fingers. The sac was held in its new position by several interrupted sutures attaching it to the sterno-mastoid muscle. Iodoform packing was inserted around the sac to its neck, and the wound was left partially open. During the interval of 10 days between the two stages of the operation, the patient was able to swallow nourishing fluids without any difficulty. Healing of the wound progressed well, there being a noticeable diminution in the size of the exposed sac. The iodoform packing was removed on the 7th day.

Completion of the operation was undertaken under local anaesthesia to a point where the sac was again freed to its œsophageal communication, after which a general anaesthetic (ether) was used, on account of the distressing choking sensation of which the patient complained. The diverticulum was then amputated about half-way along its length, and the mucous membrane lining was separated from the outer fibrous sheath to the œsophageal opening and excised, allowing a redundancy of one-quarter of an inch. This was inverted by a small strip of vaseline gauze, placed in the sac canal and covered by the outer sac. Cigarette drains were inserted.

Failing to pass the duodenal tube for post-operative feeding, the patient's objections discouraged any further attempt. He was supported entirely by parenteral fluids for the first six days, after which he was allowed fluids by mouth. He was discharged on December 23, 1935, with a rapidly closing fistula and the disappearance of all discomfort. He returned one month later with a healed wound.

COMMENT

The distinctive and singular group of symptoms as presented in this case should be sufficient to aid in the investigation for the presence of a pharyngo-oesophageal diverticulum. The measures taken to prepare the patient will depend largely on his general condition and state of nutrition. Preliminary gastrostomy may be necessary in certain cases. The employment of a two-stage operation under local anaesthesia is a comparatively safe surgical procedure.

A CASE OF CARCINOMA ARISING FROM A FETAL "REST", PROBABLY ADRENAL IN ORIGIN

By WILLIAM OLIVER STEVENSON, M.B.,
F.R.C.S.(E.), F.R.C.S.(C.)

Hamilton

This case is of interest on account of the history which it presented, the incorrect diagnosis made, and its comparative rarity.

Mr. G.L., aged 27, unemployed, was admitted to the Hamilton General Hospital on December 10, 1934.

History of illness.—During the previous five months the patient had not felt well but had never consulted a doctor. Five weeks prior to admission he had had an attack of acute pain in the abdomen and had vomited. This pain, which was colicky in type, passed off within two or three days. He felt so miserable with lack of

strength and loss of appetite that he lost twelve pounds during the next five weeks. Due to the insistence of his brother, he consulted a doctor on the afternoon of December 10th who immediately sent him into the hospital.

Physical examination.—The patient looked ill; temperature, 101° F.; pulse, 120; respirations, 28, and a white blood count of 24,200. Some distress was felt generally over the abdomen, but more in the right iliac fossa; constipation. The abdomen was slightly distended, and what appeared to be faecal masses were palpable along the line of the colon. Rigidity of the right rectus was more pronounced than the left. An enema was very effectual. Rectal examination showed a large fluctuating swelling filling the pelvis.

Diagnosis.—Large appendical abscess following an acute attack of appendicitis five weeks before.

Operation.—Through a McBurney incision, made well out, an attempt was made to open this abscess extra-peritoneally. This the operator found impossible, as the swelling apparently pushed ahead of his finger. Through the same incision, the peritoneum was then opened and blood-stained fluid was immediately obtained. Realizing that the case was not one of appendical abscess, this wound was closed and a mid-line incision was made. Passing the hand into the pelvis, a large sponge-like tumour was scooped out. This mass was at least seven inches in diameter, with a loop of small bowel running through its centre. The tissue was so friable that it was bleeding profusely and pieces of it broke off in the hand. Glands were palpable at the root of the mesentery and up both sides of the aorta. Frozen section revealed a very cellular carcinoma. The abdomen was closed. The patient died on December 22nd.

The pathological report on this tissue (paraffin section) reads as follows.

Gross description.—The specimen consists of two pieces of tissue taken from a tumour attached to small bowel, one measuring 5 by 3 by 4 cm., the other 5 by 2 by 1.5 cm. The cut surface shows a papillary, grey, granular, carcinomatous appearance."

Microscopic examination.—The tissue on section consists of undifferentiated epithelial cells which in some areas are in solid masses, and in other areas there is a suggestion of papillary arrangement. The cytoplasm of the cells is acidophilic staining and in some areas the cells are foamy in appearance. The general picture is that of a highly malignant carcinoma, with the small bowel not the primary source. *Pathological diagnosis.*—Carcinoma, grade IV."

A limited post-mortem examination was obtained. This revealed the following. "At the root of the right diaphragm, lying just beneath the peritoneal surface, is a mass the size of a hen's egg, which on section is friable, granular, cystic, and shows small areas of yellow pigmentation. The liver lying over this tumour mass has become hollowed out to form a socket which completely enclosed it. *Microscopic.*—*retro-peritoneal tumour.* Sections taken through the tumour at the head of the adrenal on the right side show the tumour mass to be partially encapsulated by a thick, fibrous capsule. The tumour mass itself is seen to be composed of cells which show extreme variation in size, shape, and staining characteristics, and presents numbers of mitotic figures. The cells show a clear, non-granular cytoplasm, with prominent large nuclei, the nucleoli of which are small and hence stain poorly. In some areas the tumour cells have a pseudo-papillomatous arrangement suggesting carcinoma, while in other areas the cells occur diffusely and present a very fine reticulum suggestive of sarcoma.

"Fat stains show a small amount of fat which tends to occur more in the stroma than in the tumour cells themselves, and there is much less fat present than was suggested in the gross appearance. The histological picture presented by this tumour is of a very embryonic type, and its occurrence beneath the liver, which is the common site for embryonal rests of adrenals, suggests

that this is an embryonal carcinoma arising from a fetal rest, probably of the cortex of the adrenal. The great lack of differentiation of the cells, with the large number of mitotic figures, accounts for the extreme clinical malignancy of this tumour."

A CASE OF HODGKIN'S DISEASE TREATED WITH COLLOIDAL ELEMENTAL ARSENIC

By A. C. HENDRICK, M.A., M.B.,
F.R.C.S. (EDIN.) AND

E. F. BURTON, B.A. (CANTAB.), PH.D. (TOR.)

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The patient is a male aged 28 years and married. In November, 1934, he began having severe pains in the chest in the region behind the sternum and was first treated for neuritis. Gradually the lymphatic glands of the root of the neck and of both axillæ became enlarged and the pain in the mediastinal region became more severe, making breathing after slight exertion more difficult. A consultation was held and as a result one of the enlarged glands was removed from the neck and microscopic examination of the tissue at the Government Laboratory gave a diagnosis of Hodgkin's disease. This was on April 10, 1935. The symptoms gradually became more severe, compelling the patient to give up work on account of weakness and pain in the chest and breathlessness on slight exertion.

He was referred to us by Dr. David Archer, of Oshawa, on the suggestion of Dr. James Cotton, for the colloidal arsenic treatment in the beginning of September, 1935. On September 4th Dr. Cotton reported as follows. "Hæmoglobin 65 per cent; blood-pressure extremely low, 70/40; red blood cells, 4 million; white blood cells, around 12,000."

When first seen on September 12th the glands at the root of the neck and both axillæ were markedly enlarged, discrete, and fairly movable, and of firm fibrous consistency. Enlarged glands were present over both pectoral muscles and in the groins. The spleen was not palpable. There was considerable distress and pain on breathing, even when lying down, only slightly relieved by the use of hot-water bottles. Treatment with the intravenous injection of the colloidal arsenic solution was begun on September 16, 1935, with daily doses given intravenously, beginning with 0.25 c.c. and gradually increased until 2 c.c. was reached. The patient gradually improved, the pain in the chest and the difficulty in breathing diminished gradually, and in six weeks' time he was fairly comfortable. The glands were now much reduced in size. He returned to his home in Oshawa on November 28, 1935, and resumed his position, doing only light office work, and the treatment was continued by Dr. Archer.

On March 1, 1936, the patient reported to us. He said that he was feeling well and had worked at his office continuously since December, 1935, and had gained in weight. He reported to us every two weeks and the condition of the glands was noted. There was a progressive diminution in their number and size. Those over the pectorals had disappeared entirely.

The dose of the colloidal solution was gradually changed from 2 c.c. daily to 3 c.c. given three times a week, and finally to 5 c.c. tri-weekly. This treatment was given by Dr. Robert Colwill, of Oshawa, under our supervision, and he has been very faithful in carrying out our suggestions as to the treatment. The patient has been carrying on his usual office work

without interruption, and reporting to us every two or three weeks for examination. On October 30, 1936, he wrote, "I am feeling fine and showing steady improvement". Improvement has been continuous since October, 1936.

In March, 1937, when the patient reported to us he was looking well and feeling well and working steadily as usual. All the enlarged glands had disappeared except one small one in the right axilla and it was rapidly disappearing.

Editorial

RHEUMATISM AND TUBERCULOSIS

WHETHER there is or is not a form of arthritis clinically indistinguishable from rheumatism (acute rheumatic fever and rheumatoid arthritis) but due to tuberculous infection is a matter still in dispute. For nearly a hundred years, now, cases have been recorded in the literature which seem, at first sight at least, to support the affirmative, but the latest researches, conducted on modern lines, have inclined the other way. Before entering on the discussion it will be well to make clear our terms.

"Tuberculous arthritis" signifies the ordinary well-recognized type of tuberculous joint disease. The condition is characterized by pain, swelling, heat and stiffness of the joint, with atrophy of the surrounding tissues. The course is sluggish, characterized by remissions and exacerbations, and is usually progressively destructive. As a rule only one joint is affected, but there are exceptions. The onset is usually gradual and the condition often follows trauma to the joint or infection elsewhere in the body. Statistics show that an accompanying visceral lesion is present in from 35 to 50 per cent of the cases. Infection of the joint probably takes place through the blood stream, originating from some distant tuberculous focus. The positive diagnosis rests on the demonstration of the presence of the tubercle bacillus in the synovial membrane or in the fluid of the joint by guinea-pig inoculation; and also on the existence of tuberculous tissue—epithelioid cells and lymphocytes in typical picture, with or without necrosis and giant-cells. Short of the fulfilment of these criteria other explanations for the arthritis may justifiably be advanced.

That there is some association between tuberculosis and certain atypical forms of arthritis that resemble rheumatism was pointed out long ago. Bonnet, in 1845, noted that frequently joints which appar-

ently were the seat of chronic atrophic polyarthritis (rheumatoid arthritis) gradually developed the features of "white swelling" (tuberculosis). Charcot, in 1864, described a large number of patients with various forms of polyarthritis who subsequently succumbed to pulmonary tuberculosis. Similar observations were made by many others, notably, Lancereaux (1871), Gubler (1874), Laveran (1876), Pollosson, Bouilly (1878), Landouzy (1880), and Grocco (1892).¹ The last-mentioned observer insisted that patients with visceral tuberculosis might develop a form of arthritis unassociated with tubercles or abscess, simulating what is now called atrophic (rheumatoid) arthritis. Poncet,² of Lyons (1897), has probably done more than any one else to support the view, expressed here in general terms, that certain tuberculous patients may at times develop arthritic lesions closely simulating those of rheumatism. He reported the case of a man who probably had pulmonary tuberculosis and certainly had tuberculosis of one hip-joint and polyarthritis, and who after the subsidence of his chief disturbances developed a chronic polyarthritis resembling rheumatoid arthritis. Poncet believed that in such cases the particular damage to the joints resulted from toxins emanating from remote tuberculous foci such as might exist in the lungs and lymph nodes. He, therefore, introduced the conception of "le rhumatisme tuberculeux", which later he extended to include cases of acute polyarthritis. That there is a general resemblance between the clinical behaviour of

1. GROCCO, P.: Cenni sopra due forme cliniche poco comuni di infezione tubercolare, *Sperimentale*, 1892, 447 and 1893, 1.

2. PONCET, A.: De la polyarthrite tuberculeuse deformante ou pseudo-rumatisme chronique tuberculeux, *Ass. franç. de Chir., Paris, (procès-verbal)*, 1897, 2: 732.

rheumatism and tuberculosis few will deny, but Poncet in his enthusiasm included in his scheme many cases of acute arthritis that certainly were not tuberculous, together with some few that possibly were. The views of Poncet were for a time vigorously combated by the savants of Paris, and of course by the Germans, but gradually gained ground. At least, we can say that even now, after forty years, his main contention has not been disproved. For some years interest in the subject died down, but since 1925 has been revived, chiefly on the continent of Europe; in England and America comparatively little attention has been paid to it.

Since the time of Poncet the conception as he stated it has been somewhat modified. At present the term "tuberculous rheumatism", as employed by those who follow Poncet's teaching, designates a form of multiple arthritis distinct from "tuberculous arthritis", but yet having some relation to tuberculous infection. In the case of ordinary tuberculous arthritis the mycobacterium of tuberculosis exists or is believed to exist in the joint, but in the case of "tuberculous rheumatism" its presence is not necessarily presumed.

That rare cases of "rheumatism" due to *Mycobacterium tuberculosis* may occur, which are, clinically, difficult if not impossible to distinguish from ordinary rheumatism, (acute rheumatic fever and rheumatoid arthritis) attributed to the activity of streptococci we may not categorically deny. Still, opinions differ. Ory³ and Cooperman⁴ believe in the existence of "tuberculous rheumatism." Rist and Dufour deny its reality, holding that the presence of polyarthritis in tuberculous patients is merely a coincidence. Brav and Hench⁵ think that no incontrovertible proof has been advanced to establish the existence of such an entity.

If we admit the existence of "tuberculous

rheumatism" we should be ready to put forward some reasonable theory of causation together with the evidence bearing on the point. Several explanations, indeed, have been advanced and they are not very unlike those offered in the case of ordinary rheumatism. We may mention the chief, together with the names of some of those who have supported them.

(1) Diffusible toxins (Duvernay; Chaliér; Auclair and Rodiguer; Bruault and Cour-eaux; Letulle.)

(2) That the lesion is due to attenuated tubercle bacilli in the joints (Griffon; Maucclair; J. Weill; Ory; Van Breemen.)

(3) That the lesion is due either to diffusible toxins or attenuated microorganisms, a view propounded by Poncet and Leriche in 1909 after twelve years of study.

(4) Allergy (Bezançon; Bernard and Calice; Nové-Josserand; Reitler; Weill; Frugoni and Persico.)

(5) The action of an ultra-virus (Fontes and Vaudremer; Ourmanský; J. Weill.)

(6) That the lesion in the joint is an atrophy due to a central or peripheral involvement of the nervous system by tuberculosis (Teissier and Roque; Roger; Froment; Ferru.)

All this is merely theoretical, although a stray case has been invoked in support of each theory. The theories of diffusible toxins and allergy rest on even less evidence than they do in the case of ordinary rheumatism. One may object to the view that the lesion in "tuberculous rheumatism" is due to an attenuated tubercle bacillus or a tuberculosis ultra-virus on the ground that if the microorganism of tuberculosis is present in the joint in any form then the lesion is actually a tuberculous arthritis and should be dropped out of the category of "rheumatism".

The arguments against the conception of "tuberculous rheumatism" may be summed up as follows. There is no adequate clinical method of identifying it; no consistently characteristic roentgenological picture; no experimental evidence in its favour that is not highly controversial; and there has been no consistent demonstration of any characteristic histological picture.

A.G.N.

3. ORY, D.: Du rôle de la tuberculose dans les rhumatismes, *Acta Rheumatologica*, 1932, 4: 8.

4. COOPERMAN, M. B.: Chronic tuberculous polyarthritis, *Ann. Surg.*, 1932, 96: 1065.

5. BRAV, E. A. AND HENCH, P. S.: Tuberculous rheumatism—a résumé, *J. Bone & Joint Surg.*, 1934, 16: 839.

CHEMOTHERAPY IN STREPTOCOCCAL INFECTIONS

THE bacterial, in contra-distinction to the parasitic, diseases have been notoriously unresponsive to chemotherapeutic agents, even Ethylhydrocuprein in experimental pneumococcus infections not living up to its early promise when applied clinically. It is therefore with a hopeful if justifiable scepticism that the reports on the use of azo-dyes in streptococcal diseases have been received.

Domagk, in Germany, first observed that the presence of a sulphonamide grouping in the azo-dyes increased their potency for protecting mice against a lethal dose of hæmolytic streptococci, although the *in vitro* antiseptic value was lessened. The particular dye with which he obtained these results (1935) was the hydrochloride of 2:4-diamino-azobenzene-4-sulphonamide. In France Levaditi, Vaisman, Nitti, and Bovet repeated and confirmed the animal experiments in general, their results however being less spectacular. Nitti and Bovet also noticed that certain strains of streptococci were more resistant to treatment than others. Information concerning the active radical in the compound was then adduced by J. and Mde. Trefouel, who were able to get equally good protective results in mice with para-aminobenzenesulphonamide hydrochloride, and other observers have reported on related active compounds containing the essential radical. The toxicity of some of these later compounds has been found less than that of the dye originally used; they are colourless and more soluble. The experimental results in animals have now been repeated in England by Buttle, Gray and Stephenson¹ and by Colebrook and Kenny,² with clear indication that these compounds exert a curative effect on streptococcal infections in mice. Several different strains of streptococci were employed.

Besides the papers bearing on animal experimentation, several have been published in Germany on the clinical use of the dye in human infections, *i.e.*, erysipelas, puerperal fever etc. with unanimously favourable results. These clinical records are however scant in detail and uncritical, so it is most opportune that we now have available two clinical reports by Colebrook and his collaborators from Queen Charlotte Hospital, London. The first of these appeared in June, 1936, and concerned the treatment of 38 cases of sepsis in the isolation wards of the hospital. In the authors' opinion 45 per cent of the cases would have recovered without treatment, so that these do not help in assaying the effect of the treatment. In 42 per cent the drug probably hastened or determined recovery, including three cases of especial evidential value as in all there were signs of general peritonitis and in one a few colonies of streptococci were cultured from the blood stream. Two other cases which also recovered nevertheless appeared to be unfavourably affected by the drug. Three of the 38, or 8 per cent, died. These results appeared to be very encouraging for a first trial. The drug was given both by mouth and parenterally, and there was only occasional toxic manifestations. In a more recent paper Colebrook and Kenny have added a further 26 cases of puerperal sepsis treated with this drug with no deaths, although six were septicæmic, a remarkable tribute to the efficacy of the treatment.

Until recently the rationale of treatment was unknown since the dye itself has little bactericidal effect *in vitro*. It was assumed that in some way it affected the capsular substance or toxicity of the streptococci in the body but no proof was forthcoming to support these theories. Following up the line of work suggested by Trefouel, Nitti and Bovet, that the azo-dye does not work as such but is converted in the body into another substance *p*-amidobenzenesulphonamide, Colebrook, Buttle and O'Meara have found that this compound has a high bactericidal effect on streptococci in blood provided that the number of organisms is not too great. As far as can be ascertained this is

1. BUTTLE, G. A. H., GRAY, W. H. AND STEPHENSON, D.: Protection of mice against streptococcal and other infections by *p*-aminobenzenesulphonamide and related substances, *The Lancet*, 1936, 1: 1286. See also Editorial, *Brit. M. J.*, 1937, 1: 1286.
2. COLEBROOK, L. AND KENNY, M.: Treatment of human puerperal infections and of experimental infections in mice with prontosil, *The Lancet*, 1936, 1: 1279.
3. HORLEIN, H.: Chemotherapy of protozoal and bacterial disease, *Brit. M. J.*, 1935, 2: 698.

the first occasion on which a germicide has been found to exert a definite killing effect on bacteria in the blood in a dilution readily attainable in the living patient.

Another distinctly unusual feature of this "sulphonylamide" drug is that it is given orally, and hence its ease of administration should enable it to be widely used and one may soon be in possession of reports on the results of treatment in a variety of strepto-

coccal infections, such as scarlet fever, sore throat and surgical sepsis. It may well be that if further clinical trial substantiates the present results the discovery will rank as one of the major therapeutic "finds" of our time. The drug is now available in Canada commercially so that it will undoubtedly be widely used, and it is hoped that answers will be found to some of the many problems.

ARNOLD BRANCH.

Editorial Comments

Fluoresceinuria

One of the medical curiosities to which attention has recently been drawn is fluoresceinuria. A dose of fluorescein will produce in the urine an intense greenish fluorescence. Of course, if the drug has been prescribed by a physician this occurrence will cause no excitement, but if, as may be, certain proprietary remedies containing fluorescein are taken by a patient on his own initiative or administered as a practical joke the result may be disconcerting or even alarming. Two cases of the kind have recently been observed at St. Bartholomew's Hospital, London, following the ingestion of "Ephazone", a proprietary remedy for asthma. One is reminded here of "Gin Pills", advocated for "rheumatism" and the "kidneys", which contain methylene blue. Perhaps the pigmentation of the urine thus produced is regarded as proof of the efficiency of the remedy!

Fluorescein is excreted fairly rapidly by the kidneys and may be found in the urine within an hour after its administration but has disappeared at the end of twenty-four hours. The presence of fluorescein should be suspected in cases where an otherwise normal urine presents an intense grass-green fluorescence. If the dye is present the spectroscope should reveal an absorption band between 506-482 $m\mu$ (maximum at 494 $m\mu$) almost identical with that of urobilin, with general absorption on the blue side of 430 $m\mu$. If such a urine be acidified with hydrochloric acid the fluorescence and the absorption band disappear.

A.G.N.

Kaolin

Clays of various kinds, under the generic term "Kaolin", are being used more and more at the present time, particularly in the treatment of food poisoning. Examination has shown that there are among them various grades of quality, so that they are not all equally desirable for therapeutic use, especially if they are to be taken internally. Even Kaolin B.P. has some shortcomings. The main objections are that some samples of kaolin, even when the clay has been refined, still contain many gritty particles, and some also "ball up" when moistened, in the latter case, of course, becoming by so much ineffective. Dr. N. Mutch,* after careful experimental studies, finds that the tests laid down in the British Pharmacopœia are insufficient to establish identity of kaolin, chemical purity, pharmacological activity, or freedom from insoluble gritty contaminants. He concludes that many of the failures attendant on the indiscriminate use of kaolin are attributable to the employment of unsuitable preparations. He has demonstrated the impossibility of deducing correctly the therapeutic potency of an adsorbent on the basis of its ability to adsorb some arbitrarily chosen dye, methylene blue or Congo red, for example. A clay should, rather, be tested against specific toxic materials having clinical significance. He has done this in his own work and the result is an interesting and important paper. It is evident that the whole matter of the purification of the various "clays" so that they will be better adapted to their therapeutical applications is somewhat urgent.

A.G.N.

* Mutch, N.: Medicinal kaolin in food poisoning, *Brit. M. J.*, 1937, 1: 595.

Men and Books

THE EARLY ADMISSION BOOKS OF THE MONTREAL GENERAL HOSPITAL

By H. E. MACDERMOT, M.D.

Montreal

The Montreal General Hospital has preserved the registers of all its patients since the day it opened in 1823. At first these contained little more than the names. Detailed case records do not seem to have been kept before 1882, when the medical casebooks begin.* There may have been others of an earlier date, which have been lost, but it is unlikely that at first many details were recorded. Dr. Caldwell, in the early days of the hospital, referred to a "case-book", in which the prescriptions for the patients were written, but this cannot be found. The earliest prescription book on hand is for 1845, which was some years after Caldwell's death.

These registers are therefore almost all we have to tell us about the medical side of the hospital in its earliest years. They may seem to contain only meagre details, but they were carefully kept, and a very fair idea of the work of the hospital may be gathered from them.

The present notes have been made from the registers up to 1865, when their form was changed slightly. The indoor and outdoor patients were recorded in separate registers from the first, but the outdoor list contains merely the names and dates, not even giving any diagnoses. The indoor record was much more complete. It showed the name, sex, age, religion, country of birth and residence, and dates of admission and discharge. There was a column for the diagnosis, one also for recording those recommending the admission of the patients, another to show whether they were "Pay Patients" or "Paupers", one for "Hospital Charges", and a "Remarks" column. A unique entry for one patient (this was in the days of shillings) records that while he was sent in as a "Pauper" he was "willing to pay 5/ per week".

Most of the entries seem to have been made by the apothecary, probably directed by the medical men. The most interesting information is contained in notes found in the "Remarks" column, but, unfortunately, these are rare. One may look through hundreds of entries without finding any comments at all, and even then they may not be worth noticing. However, this makes the search all the more interesting.

* The first case recorded in these is one of cerebral abscess, under Dr. Osler.

The first record of indoor patients is dated May 3, 1823, the day on which the hospital was opened. A pencilled note at the top of the page records that eight patients were brought from the temporary hospital (on Craig Street), but gives no account of them. The first patient was "Richard King, 39, Anglus, from La Chine, with hepatitis, recommended by the La Chine Canal Company; to pay 5/ per week". The building of the Lachine Canal, which had been begun the year before, provided several casualties for the hospital, under such diagnoses as "fractura", "vulnus", "contusio", and "ustus" or "ambustio", the two last being synonymous with burns.

The nationalities of the patients were recorded in Latin for the first few years, Anglus, Hibernus, etc., or in the corresponding feminine form. Occasionally, a slip was made in the gender; Elizabeth Slaughter, for example, is shown as "Americanus" but a little later on accuracy is regained in "Venus Safford, Americana".

There was a great variety of nationalities among the patients from the very first. In May, 1823, for example, the following were recorded within a few days: Hibernus, Anglus, Americanus, Germanicus, Canadensis, Scotus, Norwegian, and Welshman. The last two apparently were not thought worthy of Latin appellations. Hibernus and Hiberna (usually shortened to "Hib."), were the most frequent entries, on account of the large numbers of Irish immigrants at that time.

At first the policy of making the patients pay something if possible was strictly followed, and entries of charges—usually 5/ or 7/ per week—are often found in the first few years. Then they become rare. In very many instances the patients were Irish immigrants, than whom no one could reach greater depths of poverty. They seldom brought anything with them except disease.

Now and then there are notes in connection with these charges. For example, Fr. Albert, admitted on November 19, 1828, with a "vulnus", agreed "to pay 5/ per week if he gets better, if not, not to pay anything". He left "cured" on November 25th. The same understanding was reached with Moses Kennedy, Hibernian, from Kingston, who was admitted with "ophthalmia", but after two weeks the hospital found that they had made a bad bargain, as the note reads, "Incurable; discharged without paying". In the case of Wm. McIntyre, admitted with "ankylosis" on March 26, 1858, a charge of 5/ per week

apparently was agreed on, but after ten days "he left the hospital without paying, leaving an old coat behind".

Sometimes a reduction was made, as in one case in which an original charge of 5/ per day was reduced to 2/6 per diem, "he being a medical student, and catching the disease in hospital". More than once the money was refunded entirely, as in the case of Thomas Huxley, an English immigrant of 28, who was admitted on April 13, 1831, with intermittent fever, as a pay patient at 7/8 per week. He paid 18/6 on his discharge, but the apothecary, Mr. G. R. Peyton, adds the note: "His money I returned by an order from John Try, Esq." It may have been all the money the great Huxley's namesake had. Similarly with Patrick Coughlahan, 20, admitted on January 8, 1833, with "ulcus", the note on discharge reads: "5 dollars received, ordered by the Com. of Management to be returned to him". And there were a few others of like nature.

A charge was almost always made to patients with venereal disease, usually 5/ per week, and this was expected to be paid. On June 15, 1837, Michael Graham, an immigrant, admitted with syphilis, was discharged after one day's stay, "not having enough money to defray his expenses". And another Irishman, Dennis Kelly, with the same complaint, was discharged on July 24th, as "he had no money". So with Patrick Duffy, 30, admitted on January 27, 1838, with gonorrhoea: he was discharged two days later "for improper conduct, and being an unfit patient, having no money". However, even in this type of case the quality of mercy was not strained, as we read of Patrick O'Brien, 20, admitted on November 21, 1837, with syphilis, being kept until January 6, 1838, when he was discharged "cured", with the note, "No charge made. Referred by Dr. Crawford." And another immigrant, Wm. Madigan, in like case, stayed in the hospital for four months, being discharged with the note, "is not able to pay". Sometimes, too, cases are recorded as being "sanctioned by the Committee of Management".

An independent-minded man was found in one Dan Curray, Irish, who came in on May 30, 1837, with syphilis, and to pay 5/ per week, but, "he asked his discharge sooner than deliver up his money". However, he was better than Charles Lynch, Irish, who was admitted on April 8, 1832, and discharged on April 13th, "refusing to pay and using most abusive language to Mr. Malcolm".

DIAGNOSES

These are of some interest. A glance through them recalls the series of epidemics of typhus and cholera from which Montreal suffered, largely because it was a rapidly growing sea-

port. They are interesting too as including some terms which are not now used, and also as revealing, indirectly, something of the life and times generally. For example, frostbite was more commonly seen in the hospital than it is now. The winters probably were no worse than they are now, but the conditions amongst the poor, especially those spending their first winter in Canada, may have led to more severe effects. Canadians, however, are also found amongst those admitted for frostbite. The descriptive term generally used was "gelatus", and occasionally "frostbite". On December 31, 1828, there were 13 admissions with the diagnosis of "gelatus", all being immigrants. The winter of 1832-33 also must have been severe, as there were 18 patients with "gelatus", including several in March, one in April and one in May. Again, in 1837-38 the entries become numerous, the diagnosis being changed to "congelatio".* On December 23, 1837, Mary MacDonald, 32, Irish, was admitted with this diagnosis and died on January 17, 1838. There were several more throughout that winter, including J. McConnell, 22, Irish, who came in on December 10, 1838, with "frostbite", and was discharged on May 8, 1839, on account of "irregular conduct". In 1845 there were ten between December and February, and on March 31, 1857, a patient was admitted with tetanus and died four days later, with the note: "the disease was brought on by frostbite". A diagnosis of "exposure to the elements" was made in the case of Michael McConnell, 68, who died three hours after his admission on November 22, 1846.

It is rather curious that so many should have suffered from the effects of cold in May. One patient was admitted "gelatus" on May 25, 1822, who stayed in till September; two more in May, 1824, another on May 22, 1834, and another on May 9, 1838, who was discharged merely "relieved". Conditions must have been most extraordinary to produce the entry on June 8, 1838, of H. Jefferson, 21, from the U.S., with "frozen foot". He had a toe amputated on June 11th, and was discharged "cured". It may of course have been a late effect.

The diagnoses naturally include some which are not now used, some because we know a

* I have taken this to refer to frostbite because the diagnosis occurs almost only in the winter months, but when we find a patient with "congelatio" on August 15, 1838, it probably means something else. Dr. W. W. Francis tells me that Blancard's "Physical Dictionary" defines congelatio as being the same as catalepsy, which is "an abolition of all the animal functions The cause of it seems to consist in the obstruction or angustation of the *corpus striatum*, in those pores, by which objects are represented in the brain; so that there's no perception of any object; but the pores by which the animal spirits are conveyed from the brain to the organs of sense, are left free and open."

little more, others because we have simply exchanged one uncertainty for another, others again because we do not see the diseases—chlorosis, for example. These diagnoses, it must also be remembered, were made on admission, and probably many of them would have been altered by the medical men before the patient was discharged. A few such alterations are recorded, and a few additions, but not many.

"Whiteswelling" we now know as tuberculosis of the knee joint; more than once it is recorded as reason for amputation. "Porrigio furfurans" would not be now indulged in, nor perhaps "emansio mensium". "Ambustio" and "ustus" for burns, were frequently used. "Psora" was a term of infinite elasticity apparently; it appears very often. An older dictionary defines it as "A wild scab that makes the skin scaly", and undoubtedly it included scabies. But it seemed also to be applied to any obscure skin condition. We have exchanged it for "eczema".

"Dolor capitis" has an air of grandiloquence, but the one case in which it was used probably admitted of no very clear-cut definition of his headache. At any rate, the poor fellow with this diagnosis, one Murdoch McRae, Scotus, 27, came in on May 5, 1824, and died on June 24th.

"Hernia humoralis" is a little obscure. I can find no definition of it. It has been suggested to me that it may have been hydrocele. There is one entry of "nodes", a charmingly vague description that may have meant anything from glandular fever to Hodgkin's disease. It may have been periosteal gummata, but syphilis was too well known not to have been diagnosed as such. Once "pseudo-syphilis" is recorded. There were two entries of "Noli me tangere", which of course was rodent ulcer.

The term "synochus" was another favourite blanket diagnosis, having reference to any unexplained fever. It occurs very often in the early books, but is not found much after 1842. Sometimes it was varied by "Febris continua communis", or just "Febris". Probably a good deal of it was true typhoid, not then diagnosed as such, of course. Typhus was well understood, and in most cases was accurately diagnosed, but the term must have covered some typhoid also. From the summer of 1831 onwards "synochus" begins to yield to "typhus", the latter being written over the other in one instance.

The first case of typhus was Jas. Connelly, Hibernus, a man of 60, admitted on July 15, 1822. A curious note is made in the case of Peter Collins, 40, admitted as "typhus" on December 19, 1837, and discharged "cured" two days later, "wishing to make this an asylum". John Smith, 34, born in Germany,

was admitted with typhus on December 19, 1837, and discharged on December 30, with the note, "Now assisting the cook, unknown to the committee, therefore home." Think of a case of typhus in these days found "assisting the cook" ten days after admission! More than once there are notes to say that discharged patients became nurses or found other employ in the hospital. Of course we cannot tell how ill the patients were on admission. Nor does the description "cured" tell us much about their condition on discharge. Occasionally the entry is merely "relieved". Now and then "incurable" appears.

A change of diagnosis, or at least an additional one, was necessary in the case of Amelia Millard, who was admitted with "synochus" on August 8, 1837, and discharged on August 22nd, with the note: "Cured; was brought to bed at a quarter past 8 p.m., 9 August '37." The admission column then shows the additional note "Uter. gest." Other cases of childbirth are recorded, although maternity cases were not admitted as such. Jane Hart, 35, Irish immigrant, admitted on September 29, 1837, with "typhus" was discharged "cured" on October 22nd, with the note that "at 10½ p.m. Oct. 13, she was delivered of a daughter." The typhus, if such it was, seemed to be no bar to a successful confinement, but in another case, in which the order was reversed, the result was less happy. Henrietta Graham, 18, English, died on September 9, 1844, with the note: "She was confined and brought to the hospital 5 days after, having been neglected by her attendants, and consequently took fever and died."

Diagnoses were sometimes altered, just as they are sometimes today. Mary Neeson, 35, Irish, came in on May 7, 1842, with "rheumatism", and on June 24th died of "phthisis". John McDonald, 28, Irish, was admitted with "dyspepsia", but is shown on July 28, 1842, as "died of cholera", and another case was admitted with typhus, but died of phthisis. Bessie Dobson, Irish immigrant, came in with "chlorosis" on December 26, 1846, and died of "typhus" February 3, 1847. Patients, as well as members of the hospital staff, were apt to acquire typhus in the hospital. Christopher Witch, 78, Lutheran, was admitted with "Farr's tubercles of the liver", but died of "apoplexy", October 10, 1857.

OPERATIONS

Only a few references are made to operations, and there must have been many more than are here mentioned. The first recorded is on May 14, 1822, when in a case of compound fracture, the patient's thigh "was amputated with success by Dr. Robertson". Sometimes emphasis is laid on the success of the operation as such; perhaps in the absence of anaesthetics it

was often something to be able to finish an operation at all. On July 14, 1821, R. McMahon, Irish, was admitted with a "vulnus", from which he died two days later, the note being made that "The external iliac artery was tied by Dr. Stephenson with success as to the operation." Again, in the case of El. Slaughter, an American, who had ascites and died: "Paracentesis was performed with success as to the operation by Dr. Loedel."

These records are not full enough to give us any accurate idea of the operative mortality, but judging by the information they contain, the results were excellent for those days of sepsis. On May 4, 1823, in the case of John Thomas, a boy of 11, with white swelling, "amputation of the thigh was performed with success by Dr. Lyons", and the boy discharged "cured". Elizabeth Pettendrick, 32, Scots, was admitted with "schirrus" on February 1, 1824, and "extirpation of the breast was performed with success by Dr. Caldwell", and the patient discharged "cured". As might well be expected, she was readmitted in June with "cancer"; later she was discharged "at her own request". Bridget Thornton, 28, Hib., was admitted with cataract on March 9, 1824: "the operation of couching was performed with success by Dr. Robertson." Antoine, an Indian, 26, admitted with "ustus" was discharged "cured—his arm was amputated 15 May, 1830, by Dr. Stevenson with success.

The operation was not entirely to blame in the case of Jas. McClelland, who came in on January 30, 1858, with "bronchitis" and died on July 17; the note (made by Dr. Craik) says: "Dr. Sutherland performed perineal section for stricture in 1854, but although the operation was successful at the time the stricture returned, and until his death the urine was voided from a dozen sinuses, some almost as high as the umbilicus."

"Holt's operation" for stricture is mentioned on three occasions, in 1863, all of the patients being sailors. The Taliacozzi operation is first mentioned as having been done by Dr. Crawford in a case of syphilis, on March 13, 1844. It was done again in 1856 and 1864, for ectropion and lupus respectively, and there is also an entry of a patient being admitted who had had the operation performed beforehand, and it had evidently failed. In a case of hernia, "Wood's operation" was performed by Dr. Howard on March 28, 1864.

The earliest record of a tonsillectomy in the hospital is in the case of Mary McGinnis, 42, Irish, who was admitted with "Cynanch. Tons." on November 29, 1838, and discharged on January 21, 1839, "Cured by extirpation."

IMMIGRANTS

It was the flow of immigrants* into Canada which largely determined the foundation of the hospital in the first instance, and it is therefore to be expected that they would constantly appear in its records. They were not mentioned as such, however, until 1824, when on September 30th the entry is made of John Carrot, 24, Hibernus, "Irish emigrant", with "ulcus". Next summer saw large numbers of immigrants in the hospital, most of them with "synochus" and each succeeding summer brought fresh floods of them. They fell off sharply with the close of navigation each year, although a few were still recorded in the winter months. Once we find a note by Dr. Stephenson, on May 23, 1838, "the first emigrant this year". Whether this was a sigh of resignation for what the summer was to bring, or of relief at the opening of navigation again, who shall say?

For some years therefore the hospital population had large numbers of immigrants, and of these a very large proportion were Irish. They not infrequently ran away from the hospital. Mary Dudeson, 28, Hiberna, admitted with rubeola, is shown as "absconded". Michael Harrington, Irish immigrant, 32, admitted with synochus on November 29, 1836, "ran out the same day that he was admitted", and Thomas Dowde, 13, Irish, with "psora" on January 15, 1837, is shown on the same day as "Ran out—through fear I believe—after the nurse had shown him his bed." James Fitzgerald, Irish, 35, admitted with dropsy on September 14, 1837, is recorded on September 25th as, "Ran away early in the morning in dread of Jack Ketch." George Joyce, admitted on July 2, 1838, with "glass in throat", left "of his own accord about 7 a.m." three days later.

Often the discharge was "at own request", as in the case of Margaret Cooney, 17, admitted with the rather vague diagnosis of "necrosis" on March 26th, and discharged on April 18th, "Relieved—at her own request". On May 31, 1837, two patients admitted with "rheumatism" asked for their discharge "sooner than take their medicine". This time they were not Irish. One was a seaman, George Knox, shown as "Church of Scotland", and the other was from Montreal, of the Church of England. What the medicine was we are not told.

A great many patients were discharged on account of "irregular conduct", as many as five in one day (May 8, 1839), including an Irish immigrant of 22 who had been admitted for "frostbite" the preceding December. The entries of this kind are much more numerous in some years than in others, almost so much so as to suggest that conditions in the hospital

* They are practically always referred to as "emigrants" in the records.

were at times less congenial than at others. The discharge often reads simply "Irregular", but sometimes it is qualified: Emily Jolie, 31, on May 10, 1824, "for improper language"; Wm. Newman, October 20, 1845, with morbus splenis, "irregular—would not submit to treatment"; Jas. Alexander, with iritis March 26, 1846, "irregular—for smoking", and Barry Laughrin, 35, "irregular, for smoking—second time discharged". Pat McKinnon, Irish, 60, with ulcer, February 17, 1847, "Irregular—for abusive language to the nurse". Catherine Fleming, 20, Irish, with dyspepsia August 14, 1845, "Bad conduct—impudent"; and finally, an Irish patient on August 7, 1862, "for grossly irregular conduct".

Evidently a list of these patients was kept separately, as there is a note in one of the registers from which one gathers this (it is nearly illegible), and every now and then a patient has "black book" written against him. There might well have been even more than are recorded, as many admissions of "delirium tremens" are recorded, varied by an occasional "ebrietas". In the month of September, 1845, seven patients were admitted with "delirium tremens", and there were many more that winter. Two died on admission. On December 31, 1857, Henry Palmer, admitted with this diagnosis, was discharged as he "broke double window".

MORTALITY

The first death recorded was in 1822, Jos. Roberts, Canadensis, who died from "ustus". At the end of the second admission volume there is a list of those who died before they had been three days in the hospital, with the following explanatory note:

"Those whose names are placed in this list are such as are admitted in a state beyond all hopes of recovery, and consequently, would swell up the lists of death occurring in the hospital. By the laws of the hospital three days (more or less) are allowed for a patient to have been admitted before such patient be placed on the lists of curable patients, and if such a patient dies within that time such a patient is placed on this list. So that in case at any future period enquiry should be made if a certain person should have died in this hospital, this book will give in one or other of its lists the required information."

This note, which was marked "copy", was evidently taken from another list which has not been preserved. The list was not kept up, but the intention to separate the hopeless admissions may account for a rather puzzling entry frequently found in the "Remarks" column, from 1837 onwards, which shows certain patients as "Dead +". One has of course to discard the suggestion that it was to signify that the patient was quite dead! One possibility was that death was found to be due to something other than the originally diagnosed trouble. This was suggested by occasional entries in which the

original diagnosis was added to, such as "dead + typhus", and in another case the patient came in with "bronchitis" and is shown two days later as "dead + he had also hypertrophia of the heart". In almost all these instances, however, the interval between admission and death was not more than three days. An exception is found in the entry for Eliza and Wm. Nusgent, two immigrant children, aged six and four, respectively, who were admitted with phthisis on August 31, 1837. Both died, one on September 4th, for whom the entry was "dead +", and the other on September 7th, shown simply as "dead". This, however, was probably covered by the margin "more or less".

There is little to guide us as to post-mortem examinations. They were made, no doubt, although perhaps not in the earliest years.* In 1845 a note is made of "abscess found in left lobe of cerebrum". In the case of Pat Ryan, admitted on May 15, 1849, with "obstruction in œsophagus", the note was: "Died; an extensive abscess caused by irritating fish-bone was found behind the œsophagus, extending from the second cervical vertebra to the 7th or 8th dorsal". Again, J. Osborn, admitted on June 25, 1849, with "morbus cordis", died, showing "ossification of the whole aorta". There may or may not have been a post-mortem in the case of Wm. Proctor, 20, who was admitted with "gelatio" on March 29, 1856, and died on April 11th, with the note, "Tetanus came on apparently from the irritation of the feet. The spine was congested".

MISCELLANEOUS

Some miscellaneous notes from the "Remarks" column may be of interest. Louis Laporte, 23, discharged cured on March 23, 1830, "was blown up by gunpowder", and Geo. Batage, 17, with "contusio" on August 1, 1845, "was blasted by gunpowder". Wm. Ross, 17, Scotch, came in with a fractured tibia, "running from Ste. Eustache when the rebels were in arms, he met with the accident." Another military casualty was Louis Guerin, 49, Canadian, admitted with a "vulnus" December 1, 1838, "A prisoner—wounded at Odelltown—arm amputated." One Prevost, Canadian, was admitted on August 21, 1838, and died the same day from "contus., etc.; he was knocked down by the racehorse April Fool." James Miller, 25, "no church", a U.S. immigrant, admitted for enuresis, on April 30, 1842, was "a runaway slave". And J. Johnstone, stranger, with "contusio" in 1861, was "a soldier belonging to the

* I say this because there are no references to any post-mortems in the early records, but it is more than likely that it was at the hospital that Dr. A. F. Holmes secured the famous three-chambered heart, which is preserved at McGill as one of Dr. Maude Abbott's most precious specimens. [See *Tr. Edin. Med. Chi. Soc.*, 1824, p. 252.]

Confederate Army." Anne Pierson, 3, an English immigrant, admitted July 8, 1842, and died July 15th, was "one of the victims of the exploded steamer." Martin Branch, 60, an English immigrant, admitted on November 15, 1843, with ascites, died on February 12, 1844: "He left his body to Dr. Campbell for dissection."

Mary Adams, 21, reminds us that "hysteria" was just as much a blanket diagnosis in 1844 as it is now, for after two months' stay in the hospital under that designation "she died of general inflammation of all the tissues of the body." Mary Kelly, 24, Irish, admitted on January 17, 1837, with "contusio", is shown as being discharged on the same day, "having requested Dr. Campbell to procure her an abortion".

We do not know whose fault it was that Alex. Campbell, a young seaman, admitted with synovitis on November 4, 1846, died on November 10th "from overdose of laudanum". Another seaman, Samuel Cooper, admitted with "typhus" on June 30, 1847, "died, by hanging himself to a tree in the M.G.H. garden at 10 p.m." on July 7th, and a month later, two patients died by jumping out of the window. Another patient, Alice Wilson, merely "cut wire screen of window and wrote obscene language on the wall." She was "discharged, irregular". About this time there must have been a shortage of attendants in the wards, as there are several entries of patients dying at night "without assistance".

Biddy Caravin, 18, Irish immigrant, with anæmia on April 29, 1848, discharged on July 28th, "was dumb; recovered speech on morning of 27th July to the astonishment of the in-

mates." S. Goldsmith, an English immigrant, admitted on September 27, 1849, with "cholera" was discharged on October 12th, "Cured by strong doses of calomel." Another English immigrant named Nicholas Neal showed equally strong powers of recovery; his discharge note reads, "This man recovered from cholera and typhus fever whilst in hospital, both bad attacks. His height was 6 ft. 5 in." And yet another instance is that of Thos. Rolland, an English immigrant, admitted on December 15, 1851, with "gelatio": his discharge note informs us on May 21, 1852, that he died "from urinary infiltration caused by old neglected stricture. He had been operated on at 10 years of age for stone, at 35 had Chopart's operation performed on both feet—had the phalanges of left hand removed—and lastly had a modification of Syme's operation performed, (also) had amputation of thumb performed by Dr. Arnoldi."

The notes are apt to be curt rather than discursive. The commonest perhaps is "Irregular". John McLean, with scrofulosis, October 4, 1857, was discharged April 10, 1858, "for being drunk". Jas. Tweedie was "troublesome", Mary Ann Cauley, with phthisis, "stole clothes of patients when going out." And Thomas Bonner, 18, was "irregular, for picking pockets." Peter Gray, 37, with orchitis on August 28, when discharged "was married this day".

Finally, Kitty Black, an Irish girl of 17, admitted with gonorrhœa on June 23, was "an exceedingly handsome girl". The very next admission was Mary Corbeill, 32, with "dyspepsia": "this patient was deformed".

INSULIN IN SCHIZOPHRENIA.—G. Langfeldt was in Vienna in 1935 when Professor Pötzl gave his first account of fifty schizophrenic patients alleged to have been cured by enormous doses of insulin. Since then the author has introduced this treatment at the University Psychiatric Institute in Oslo, but he has found it difficult to secure the necessary accommodation and nursing for a large number of cases. They have, however, been numerous enough to impress him with the dangers and therapeutic limitations of this procedure, and his guarded verdict on it is to the effect that, with the etiology so obscure and probably varied, the final judgment must be deferred. In his opinion a psychiatric hospital, which for the most part admits psychoses in the first stage, cannot be under the obligation to introduce such a dangerous treatment. If it does so the doctor in charge must be personally responsible and must be ready at any moment to interrupt the coma into which

he has thrown the patient, whose life may depend, within a few minutes, on the timely intravenous injection of glucose with or without adrenaline; the coma should never be induced if the patient's arms are not provided with veins suitable for an intravenous injection. The dosage of insulin necessary to induce coma varied enormously in the author's experience, ranging as it did from 40 units in one case to 300 units in another. When he found that 40 units did not have the desired effect the author would double the dose. The longest interval during which the induced coma lasted was about three hours, and the choice of the moment at which consciousness was restored was determined by a combination of factors such as the pulse, respiration, blood pressure, and the general clinical picture; the concentration of sugar in the blood was no guide in this matter. As for the results, they were, broadly speaking, disappointing.—*Nord. Med. Tidsskrift*, November 7, 1936, p. 1833. Abs. in *Brit. M. J.*

Association Notes

PROVISIONAL PROGRAM FOR THE SIXTY-EIGHTH ANNUAL MEETING OF THE CANADIAN MEDICAL ASSOCIATION, IN CONJUNCTION WITH THE FIFTY-SEVENTH ANNUAL MEETING OF THE ONTARIO MEDICAL ASSOCIATION, TO BE HELD IN OTTAWA, ON JUNE 21, 22, 23, 24, 25, 1937

Convention Headquarters, Chateau Laurier Hotel

The Canadian Medical Association

President, H. M. ROBERTSON, Victoria;
President-elect, T. H. LEGGETT, Ottawa;
General Secretary, T. C. ROUTLEY, Toronto.

The Ontario Medical Association

President, W. K. COLBECK, Welland;
President-elect, R. K. PATERSON, Ottawa.

Ottawa Medico-Chirurgical Society

President, R. L. GARDNER, Ottawa;
President-elect, J. H. LAPOINTE, Ottawa;
Secretary, T. L. FISHER, Ottawa.

While organization work for the forthcoming combined sessions of the Canadian and of the Ontario Medical Associations proceeds apace, special attention is invited to the provisional program which appears in this issue. The scientific agenda would indicate that the week of June 21st next should be a memorable one because of the character of the discussions and the superior qualifications of those who are to take part as leaders.

The Chairman of the Committee on Scientific Exhibits, Dr. Geo. S. Williamson, 295 McLaren Street, Ottawa, reports that so great has been the demand for space that only material of outstanding scientific merit can be accepted.

N.B.—The arrangement of this program is subject to change both as to titles and order of presentation.

Monday, June 21st

- 9.00 a.m.—Registration.
- 9.30 a.m.—Meeting of the General Council, Canadian Medical Association.
- 12.30 p.m.—Luncheon.
- 2.00 p.m.—Meeting of the General Council, Canadian Medical Association.
- 5.00 p.m.—Meetings of Committees.
- 6.00 p.m.—Meeting of Nominating Committee, Canadian Medical Association.

Tuesday, June 22nd

- 9.15 a.m.—Meeting of the General Council, Canadian Medical Association.
- 12.30 p.m.—Luncheon.

Tuesday, June 22nd—Continued

- 2.00 p.m.—Meeting of the General Council, Canadian Medical Association.
- 2.15 p.m.—Official opening of Exhibit Hall.
- NOTE.—The Council of the Ontario Medical Association will meet in Toronto on June 2, 1937.

Wednesday, June 23rd

- 8.30 a.m.—Registration.
- 9.00 a.m.—General Session.
- 12.30 p.m.—Luncheon. Guest Speaker, His Excellency the Right Honourable Baron Tweedsmuir of Elmsfield, G.C.M.G., C.H., Governor-General of Canada.
- 2.00 p.m.—Sectional Meetings.
- 8.30 p.m.—Annual General Meeting, to which all members and their ladies, guest speakers, and official delegates are invited.
Music.
- 9.00 p.m.—Call to Order by the President.
 - Invocation.
 - Introduction of Guest Speakers and Official Delegates.
 - Introduction of Senior Members and presentation of badges and certificates.
 - Installation of the new President.
 - Address of the President.
 - Reception by the President and Mrs. Leggett, followed by dancing, cards and refreshments.

Thursday, June 24th

- 9.00 a.m.—Sectional Meetings.
- 12.30 p.m.—Luncheon. Guest Speaker, The Right Honourable William Lyon Mackenzie King, C.M.G., P.C., M.A., LL.B., LL.D., Prime Minister of Canada.
- 2.00 p.m.—General Session.
- 2.00 p.m.—Meeting of Incoming Executive Committee.
- 4.00 to 6.00 p.m.—Garden Party.

Thursday, June 24th—Continued

7.00 p.m.—Subscription Dinner of the Ontario Medical Association, to which all members of the Canadian Medical Association and their wives are cordially invited. After the dinner there will be a short business meeting of the Ontario Medical Association followed by music and special entertainment.

Friday, June 25th

9.00 a.m.—General Session.
11.30 a.m.—Blackader Oration. Rheumatic fever and heart disease in childhood.—Dr. H. B. Cushing, Montreal.
12.00 a.m.—Luncheon. Guest Speaker, to be provided by the Canadian Medical Protective Association.

Immediately following the luncheon the Canadian Medical Protective Association will hold its annual meeting.

1.00 p.m.—Annual Golf Tournament. (See special notice "Golfers Attention".)

7.30 p.m.—Dinner, followed by—
- Presentation of prizes to all winners at the Golf Tournament.
- Special program of music and entertainment by the Gatineau Troubadours.

Alumni Dinners and Class Reunions for those who wish to arrange for them.

GENERAL SESSIONS**Wednesday, June 23rd**

9.00 a.m. to 12.30 p.m.

Symposium on Jaundice:

Dr. Wm. Magner, Toronto.—Pathological aspect;

Dr. A. M. Snell, Rochester, Minn.—Medical aspect;

Dr. A. T. Bazin, Montreal.—Surgical considerations.

Mr. Beckwith Whitehouse, Birmingham, Eng.—(Subject to be announced later).

Surgical Clinic.—Dr. R. R. Graham, Toronto.

Thursday, June 24th

2.00 to 4.30 p.m.

Valedictory Address of the Past President.—Dr. Hermann Robertson, Victoria, B.C.

Post-partum sepsis.—Dr. B. P. Watson, New York.

Medical Clinic.—Dr. A. H. Gordon, Montreal.

Demonstration of the electrical stethoscope. Dr. G. M. Geldert, Ottawa.

Friday, June 25th

9.00 a.m. to 12.30 p.m.

Mr. Watson Jones, Liverpool.—(Subject to be announced later).

Psychological aspects of medicine.—Dr. A. T. Mathers, Winnipeg.

Blackader Oration. Rheumatic fever and heart disease in childhood.—Dr. H. B. Cushing, Montreal.

SECTIONAL MEETINGS

Wednesday afternoon and Thursday morning have been set aside for Sectional Meetings.

The following is a list of the speakers and subjects in each Section:

Section of Anæsthesia

WEDNESDAY, JUNE 23RD

2.00 p.m.—

Anæsthesia in children.—Dr. C. H. Robson, Toronto.

The present unusual opportunities for medical men in anæsthesia.—Dr. John S. Lundy, Rochester, Minn.

Anæsthesia from the patient's point of view.—Dr. Harold Griffith, Montreal.

Carbon dioxide.—Dr. Ralph Waters, Madison, Wis.

Anæsthetic procedures as standardized for certain types of operations in a large general hospital.—Dr. H. J. Shields, Toronto.

Section of Dermatology

WEDNESDAY, JUNE 23RD

2.00 p.m.—

The treatment of recurrent erythema multiforme.—Dr. Norman Wrong, Toronto.

Roentgen and ultra-violet radiation in dermatology.—Dr. D. E. H. Cleveland, Vancouver.

Facts, fads and fancies in the treatment of acne vulgaris.—Dr. L. P. Ereaux, Montreal.

Disturbances of the sebaceous glands.—Dr. W. R. Jaffrey, Hamilton.

The past year at the skin clinic, Hospital for Sick Children, Toronto.—Dr. H. A. Dixon, Toronto.

THURSDAY, JUNE 24TH

9.00 a.m.—

Kaposi's varicelliform eruption. Report of a case with experimental evidence in support of a virus etiology.—Dr. Geo. S. Williamson, Ottawa.

Urticaria.—Dr. Harold Orr, Edmonton.

A dermatologist reviews his private practice.—Dr. E. J. Trow, Toronto.

Thursday, June 24th—Continued

- Contact eczema from dyed clothing.—Dr. J. F. Burgess, Montreal.
- Unusual skin malignancies, diagnosis and treatment.—Dr. B. W. MacDonald, Ottawa.
- Kraurosis and leukoplakia vulvæ and pruritus with lichenification treated by perineal sensory nerve resection.—Dr. B. Usher and Dr. A. D. Campbell, Montreal.

Section of Medicine

WEDNESDAY, JUNE 23RD

- 2.00 p.m.—
- Gastro-intestinal hæmorrhage.—Dr. H. A. Cave, London.
- Metastasis and metastases.—Dr. E. L. Pope, Edmonton.
- Hyperpiesia.—Dr. K. A. MacKenzie, Halifax.
- Clinical aspects of precordial pain.—Dr. W. Ford Connell, Kingston.
- Diagnosis of some major vascular accidents.—Dr. D. M. Baltzan, Saskatoon.

THURSDAY, JUNE 24TH

- 9.00 a.m.—
- An interpretation of some mechanisms in the menstrual cycle and in pregnancy in the light of sex-hormone determinations.—Dr. John S. L. Browne, Montreal.
- Recent immunological and pathological studies in experimental poliomyelitis and their significance.—Dr. Maurice Brodie, New York.
- The treatment of tuberculosis after forty years. Dr. Jules Prevost, Montreal.
- The abolition of clinical tuberculosis by anticipation and control; a definite scheme and its application.—Dr. W. E. Ogden, Toronto.
- X-ray therapy in bronchial asthma.—Dr. J. M. McEachern, Winnipeg.

Section of Obstetrics and Gynæcology

WEDNESDAY, JUNE 23RD

- 2.00 p.m.—
- The endocrine factors in normal and abnormal menstruation.—Dr. Melville C. Watson, Toronto.
- Sterility.—Dr. Ernest Couture, Ottawa.
- Menorrhagia of the menopause.—Dr. J. D. McQueen, Winnipeg.
- Obstetrical complications.—Dr. John Mann, Toronto.
- Endometriosis.—Dr. Geo. Hooper, Ottawa.

THURSDAY, JUNE 24TH

- 9.00 a.m.—
- Pre-eclamptic toxæmia.—Dr. W. P. Tew, London.
- Abortion.—Dr. H. C. Burgess, Montreal.

Thursday, June 24th—Continued

- Pre-natal and post-natal care.—Dr. H. B. Atlee, Halifax.
- Treatment of genital prolapse.—Dr. Wm. Scott, Toronto.
- Mr. Beckwith Whitehouse, Birmingham, Eng.—(Subject to be announced later).

Section of Ophthalmology

WEDNESDAY, JUNE 23RD

- 2.30 p.m.—
- Business Session.
- The etiology and treatment of keratitis neuroparalytica.—Dr. J. A. MacMillan and Dr. W. V. Cone, Montreal.
- Recurrent styes—treatment by staphylococcus toxoid.—Dr. Alexander E. MacDonald, Toronto.
- Experiences in and the treatment of detachment of the retina.—Dr. Wm. Lowry, Toronto.

THURSDAY, JUNE 24TH

- 9.30 a.m.—
- Lighting as a more exact science.—Dr. G. Stuart Ramsey, Montreal.
- Survey of cataract operative procedures in the last thirty years.—Dr. Charles O'Connor, Kingston.
- The ophthalmoscopic findings in one hundred consecutive cases of cardiovascular hypertension.—Dr. F. T. Tooke and Dr. J. V. V. Nicholls, Montreal.

Section of Oto-Laryngology

WEDNESDAY, JUNE 23RD

- 2.00 p.m.—
- Symposium.—Naso-genital relationship and the treatment of atrophic rhinitis with œstrogenic substances:
- Dr. Hector Mortimer, Montreal.—The constitutional factor in atrophic rhinitis: its probable nature and etiological significance;
 - Dr. J. B. Collip, Montreal.—The biochemical aspect;
 - Dr. R. P. Wright, Montreal.—The clinical aspect.

THURSDAY, JUNE 24TH

- 9.00 a.m.—
- Differential diagnosis of upper dysphagia.—Dr. A. H. Veitch and Dr. E. H. Shannon, Toronto.
- Stricture of the œsophagus.—Dr. G. E. Hodge and Dr. E. C. Scharfe, Montreal.
- Three cases of petrositis.—Dr. D. E. S. Wishart, Toronto.
- Functional testing of the ear.—Dr. W. J. McNally, Montreal.

Section of Pædiatrics

WEDNESDAY, JUNE 23RD

2.00 p.m.—

Childhood tuberculosis.—Dr. A. M. Jeffrey, Ottawa.

Rubella or German measles.—Dr. H. B. Cushing, Montreal.

Cerebral pneumography in childhood.—Dr. A. E. Childe, Montreal.

The physiology of the central nervous system in regard to pædiatrics.—Dr. Howard Spohn, Vancouver.

The treatment of epilepsy in children.—Dr. H. M. Keith, Montreal.

THURSDAY, JUNE 24TH

9.00 a.m.—

Immunization in childhood.—Dr. Donald Fraser, Toronto.

The obstructed or mechanical appendix.—Dr. Alan Brown and Dr. D. E. Robertson, Toronto.

The clinical use of para-amino-benzene-sulphonamide or its derivatives in the treatment of beta hæmolytic streptococcal infection.—Dr. Perry Long, Baltimore, Md.

The normal occurrence of fetal respiration and its relation to the abnormalities of the newborn.—Dr. F. S. Snyder, Baltimore, Md.

Sudden death in young infants.—Dr. Alton Goldbloom and Dr. F. W. Wiglesworth, Montreal.

The present status of vitamin therapy in childhood.—Dr. F. F. Tisdall, Toronto.

Section of Radiology

WEDNESDAY, JUNE 23RD

2.00 p.m.—

Diverticulitis of the sigmoid colon; a radiological study.—Dr. A. C. Singleton and Dr. M. R. Hall, Toronto.

Benign conditions of the uterus.—Dr. J. E. Gendreau, Montreal.

Radiological education.—Dr. W. A. Jones, Kingston.

The radiologist, an integral part in the scheme of things medical.—Dr. W. H. McGuffin, Calgary.

THURSDAY, JUNE 24TH

9.00 a.m.—

Diagnosis in the chest.—Dr. H. R. Corbett, Kentville.

Malignant disease of the breast.—Dr. G. E. Richards and Dr. A. D. Irvine, Toronto.

X-ray treatment of non-malignant skin conditions.—Dr. C. M. Henry, Regina.

Thursday, June 24th—Continued

Urology.—Dr. W. L. Ritchie, Montreal.

Differential diagnosis of bone tumours.—Dr. Bernard Mooney, Edmonton.

Rheumatic Diseases

WEDNESDAY, JUNE 23RD

2.00 p.m.—

Canadian organization to combat rheumatic diseases.—Dr. W. S. Barnhart, Ottawa.

Some problems of rheumatic diseases.—Dr. A. A. Fletcher, Toronto.

Report of a Canadian survey of rheumatic diseases.—Dr. F. S. Burke, Ottawa.

The present aspects of rheumatic diseases.—Dr. Albert LeSage, Montreal.

THURSDAY, JUNE 24TH

9.00 a.m.—

Differential diagnosis and treatment of chronic arthritis.—Dr. G. Douglas Taylor, Montreal.

Why not a status in Canada for gold therapy of arthritis?—Dr. A. W. Bagnall, Vancouver.

Business Session of the Canadian Rheumatic Disease Association.

Section of Surgery

WEDNESDAY, JUNE 23RD

2.00 p.m.—

Certain aspects of the treatment of fractures of the forearm.—Dr. G. W. Armstrong, Ottawa.

Fractures of the skull.—Dr. Arthur Elvidge, Montreal.

Automobile injuries to the head.—Dr. Fulton Risdon, Toronto.

Important minor points in local anæsthesia.—Dr. Philip D. Woodbridge, Boston, Mass.

Pruritus ani.—Dr. J. T. Danis, Toronto.

THURSDAY, JUNE 24TH

9.00 a.m.—

Infections and injuries in hands (illustrated).—Dr. J. H. Couch, Toronto.

Mr. Watson Jones, Liverpool.—(Subject to be announced later).

Some post-operative complications following abdominal operations.—Dr. Neil J. Maclean, Winnipeg.

An outline of the indications for the operation of pulmonary lobectomy: some remarks upon the choice of suitable patients for the operation and the results that may be expected.—Dr. R. M. Janes, Toronto.

The clinical problem of the nodular breast.—Dr. Fulton Gillespie, Edmonton.

Section of Urology

WEDNESDAY, JUNE 23RD

2.00 p.m.—

Hæmaturia in general practice.—Dr. R. A. McComb, Toronto.

Conservative treatment in urogenital tuberculosis.—Dr. R. C. Hastings, Quebec.

Genito-urinary tuberculosis.—Dr. J. C. McClelland and Dr. K. F. Davis, Toronto.

Lesions of the bladder neck and trigone in the female.—Dr. David W. MacKenzie, Montreal.

Neoplasms of the renal capsule.—Dr. W. J. Deadman and Dr. S. F. Penny, Hamilton.

THURSDAY, JUNE 24TH

9.00 a.m.—

Hyperparathyroidism, — diagnosis and treatment with special reference to kidney complications.—Dr. A. C. Abbott, Winnipeg.

The so-called silent renal stone.—Dr. E. D. Busby, London.

Thursday, June 24th—Continued

Late results of the treatment of bladder tumours.—Dr. Gordon S. Foulds, Toronto.

Tumours of the ureter.—Dr. Frank S. Patch, Montreal.

The significance of pain in the upper urinary tract.—Dr. Robin Pearse, Toronto.

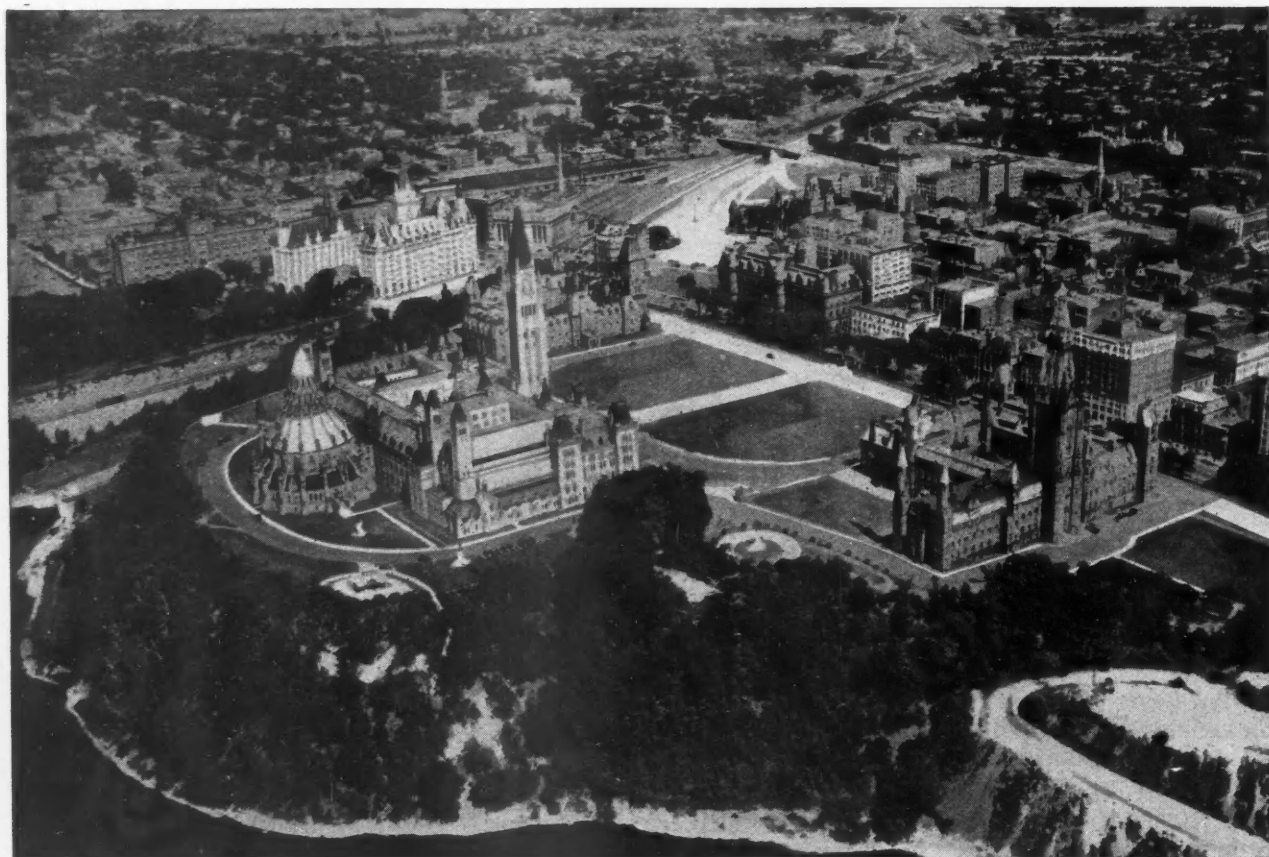
Supra-pubic prostatectomy, methods and results; a comparison with transurethral resections.—Dr. R. E. Powell, Montreal.

Scientific Exhibits

The largest scientific exhibit in the history of medical conventions in Canada will be on display. Already between forty and fifty exhibits have been arranged. These have been entered by medical schools, hospital departments, governments, insurance companies, and by individual clinicians and research workers and will illustrate various clinical and laboratory phenomena and research developments. This scientific exhibit alone will warrant attendance at the convention.

Commercial Exhibits

The Committee on Commercial Exhibits reports that fifty-five exhibit spaces are occupied at present, with applications still being received.



PARLIAMENT HILL AND BUILDINGS

LOCAL PROGRAM COMMITTEES**General Sessions***Chairman*—Dr. H. B. Moffatt*Secretary*—Dr. J. E. Plunkett

Dr. S. Evans, Dr. Norman Guion, Dr. Geo. S. MacCarthy, Dr. Geo. Armstrong, Dr. C. H. Brown, Dr. J. B. Thackeray, Dr. J. H. Lapointe, Dr. A. McNabb, Dr. C. Laidlaw, Dr. W. S. Lyman.

Section of Medicine*Chairman*—Dr. H. Laidlaw*Secretary*—Dr. R. A. Starrs

Dr. W. S. Lyman, Dr. J. E. Plunkett, Dr. S. Mirsky, Dr. Wm. Guest, Dr. L. Brown, Dr. S. Service.

Section of Surgery*Chairman*—Dr. F. P. Quinn*Secretary*—Dr. G. W. Dunning

Dr. Geo. S. MacCarthy, Dr. T. H. Leggett, Dr. H. B. Moffatt, Dr. R. K. Paterson, Dr. C. H. Brown, Dr. Geo. Hooper, Dr. R. E. Valin, Dr. S. Evans.

Section of Obstetrics and Gynaecology*Chairman*—Dr. Geo. Hooper*Secretary*—Dr. G. W. B. York

Dr. E. Couture, Dr. H. Dover, Dr. J. F. Puddicombe.

Section of Oto-Laryngology*Chairman*—Dr. J. K. M. Dickie*Secretary*—Dr. J. R. Delahay

Dr. W. P. E. Paterson, Dr. J. T. Coupal.

Section of Ophthalmology*Chairman*—Dr. W. G. Fraser*Secretary*—Dr. J. T. Coupal**Section of Radiology***Chairman*—Dr. Paul Brodeur*Secretary*—Dr. A. McNabb

Dr. R. K. Paterson.

Section of Dermatology*Chairman*—Dr. G. S. Williamson*Secretary*—Dr. B. W. MacDonald

Dr. S. E. Grimes.

Section of Pædiatrics*Chairman*—Dr. Geo. Campbell*Secretary*—Dr. J. C. Armstrong**Section of Urology***Chairman*—Dr. Wm. Hutchinson*Secretary*—Dr. E. Gaulin**Section of Anæsthesia***Chairman*—Dr. G. M. Geldert*Secretary*—Dr. H. Burgess

Dr. H. T. Jost, Dr. N. Sauve, Dr. L. E. Roche.

Section of Rheumatic Diseases*Chairman*—Dr. W. S. Lyman*Secretary*—Dr. W. S. Barnhart**Committee on Arrangements***Chairman*—Dr. R. E. Valin*Secretary*—Dr. T. L. Fisher

Drs. J. H. Alford, C. H. Brown, Geo. Campbell, A. P. Davies, C. G. Gunn, D. A. Whitton, D. A. Carmichael, G. M. Geldert, J. L. Lamy, P. Belanger, J. F. Argue, N. M. Harris, W. Hutchinson, G. S. MacCarthy, S. M. Nagle, F. P. Quinn, W. J. Stevens, J. H. Lapointe, C. Laidlaw, J. M. Laframboise, L. Gardner, J. L. Coupal, W. S. Lyman.

SUB-COMMITTEES OF COMMITTEE ON ARRANGEMENTS**Commercial Exhibits***Chairman*—Dr. Geo. Armstrong

Dr. G. W. B. York, Dr. W. A. Guest, Dr. E. P. Byrne, Dr. C. T. Fink

Committee on Housing*Chairman*—Dr. J. H. Alford

Dr. R. Law, Dr. Wm. E. Caven, Dr. Hector Featherstone, Dr. L. W. Brown.

Committee on Publicity*Chairman*—Dr. Campbell Laidlaw

Dr. G. M. Geldert, Dr. F. W. C. Mohr, Dr. E. Couture.

Committee on Scientific Exhibits*Chairman*—Dr. G. S. Williamson

Dr. Jos. Gaulin, Dr. W. G. Watt, Dr. S. E. Grimes, Dr. H. L. Sims.

Committee on Registration*Chairman*—Dr. S. L. E. Danby

Dr. J. H. Burgess, Dr. J. C. Humphreys, Dr. P. B. Belanger, Dr. A. V. Kniewasser.

Golf Committee*Chairman*—Dr. Wm. Hutchinson

Dr. L. E. Roche, Dr. A. P. Davies, Dr. R. Law.

Junior Committee*Chairman*—Dr. F. W. Jeffrey

Dr. J. F. Puddicombe, Dr. L. J. Walters, Dr. Wallace Troup.

Committee on Badges*Chairman*—Dr. D. T. Burke

Dr. J. H. Hamlin, Dr. W. J. Gordon, Dr. K. C. Butler.

Committee on Entertainment*Chairman*—Dr. J. M. Laframboise

Dr. C. G. Gunn, Dr. W. W. Mackay, Dr. C. F. Williams.

Committee on Transportation*Chairman*—Dr. W. P. E. Paterson

Dr. H. E. Hanna, Dr. S. F. Service, Dr. J. V. Berry.



SILHOUETTE OF OTTAWA

GOLFERS, ATTENTION!

During the annual meeting in Ottawa three trophies will be played for on the beautiful course of the Royal Ottawa Golf Club. These are The Ontario Cup, The Hamilton Medical Society Trophy, and The London Academy of Medicine Golf Trophy, the last to be played for by a team of four representing a County or City Medical Society.

For the information of the Committee in charge of arrangements please forward at your earliest convenience, to Dr. Wm. Hutchinson, Medical Arts Building, Ottawa, your answers to the following questions:

1. What is your 1936 Club Handicap.....
(Two flights 1-18, 19-27).
 2. Do you intend to enter the tournament for
 - (a) The Ontario Cup.....
 - (b) The Hamilton Medical Society Trophy
 3. Does your local society intend to enter a team for the London Academy of Medicine Golf Trophy
- (One team of four, only from any one Society; maximum individual handicap 18; personnel of team to be named prior to play).

The Tournament at which the trophy winners will be decided will be held on the afternoon of June 25th over the Royal Ottawa Course. Ar-

rangements have been made at three other first class clubs to accommodate golfers not competing for the cups; and the facilities of all clubs will be available throughout the week. The Committee anticipates that a large number of members will want to avail themselves of the opportunity to play golf, and requests that the Chairman be informed as soon as possible of your intention.

Along with the efforts which are being put forth to make the scientific side of the convention an assured success, it is the aim of the various committees concerned to guarantee social aspects of the most pleasing sort.

The Ottawa Doctors' Wives Association, which is affiliated with the Ottawa Medico-Chirurgical Society, has been untiring in making preparations for the entertainment of those ladies who will accompany members of the profession to Ottawa. In this connection many committees have been formed with the object of making the stay of the visiting ladies as pleasant as possible. These committees include the following: Reception, Registration and Information, Recreation and Amusements, Transportation, and Social. Plans are being made by these various committees, working in conjunction with another special committee of the local society, to entertain junior visitors as well. Sight-seeing tours, golf, swimming, tennis, special

luncheons, teas, garden parties, and private dinner parties are being arranged.

Through Mrs. C. A. Young, of the Ottawa Doctors' Wives Association, the following note has been sent forward for publication.

The ladies of the Convention Committee extend a cordial welcome to all doctors' wives and their families who expect to visit Ottawa in June.

Your presence among us will be our incentive to make your stay one of happy and enduring memory.

The setting alone—the beautiful capital of the Dominion—is magnetic to all Canadians. You will find it richly endowed with resources that will satisfy your every mood. Come to the Medical Convention and enjoy Ottawa hospitality.

The tentative **LADIES' PROGRAM** is as follows.

Monday, June 21st

1.00 p.m.—Luncheon, Country Club. Hostess, Mrs. T. H. Leggett.

Tuesday, June 22nd

9.00 a.m.—Special Drive.
11.00 a.m.—Petit Dejeuner, "Longfields", Aylmer Road, Quebec. Hostess, Mrs. J. F. Kidd.
7.30 p.m.—Ladies' Dinner, Chateau Laurier. Host, Ottawa Doctors' Wives Association.

Wednesday, June 23rd

4.00 – 6.00 p.m.—Garden Party.
8.00 p.m.—Ceremonial—Reception and Musicale, Chateau Laurier.

Thursday, June 24th

1.00 p.m.—Luncheons, Royal Ottawa Golf Club, Rivermead Golf Club. Host, Ottawa Doctors' Wives Association.
7.30 p.m.—Banquet, Chateau Laurier.

Friday, June 25th

4.00 – 6.00 p.m.—Teas.

JUNIOR COMMITTEE

The following are the plans made by the Junior Committee for the entertainment of doctors' children:

Wednesday, June 23rd

a.m.—Registration.
2.30 to 4.30 p.m.—City sight-seeing in Ottawa Electric Railway Buses.

Thursday, June 24th

p.m.—Boat trip down the Ottawa River.

Friday, June 25th

11.00 to 12.00 a.m.—Swim in Chateau Pool with exhibition of diving by Jack Norwell, Johnnie Coughtrey, etc.
p.m.—Tour of Royal Mint, Museum, Parliament Buildings and possibly Archives.

As indicative of the facilities which recommend Ottawa as a convention city, it need only be pointed out that during 1936 one hundred and seventy-seven conventions met in the capital



STRATHCONA PARK BEAUTY SPOT

city. Apart from its being favoured to an increasing extent by those who regard it as an excellent meeting place, Ottawa is becoming more and more popular as a goal for tourists from near and far. The reasons for this are not far to seek, for it provides every feature desirable to make it an ideal convention city. Important among these is its accessibility by rail and motor highway, as several of the main automobile roads of both Ontario and Quebec radiate from it.

Through the courtesy of the Federal District Commission, the Transportation Committee have been granted special parking privileges adjacent to the Chateau Laurier. This will make it possible for visiting motorists to have their cars within a very short distance of the convention rooms.

In the near future a bulletin containing interesting facts about the city and the surrounding country will be sent to all members of the profession in Canada. The information to be gathered in this way will suffice to indicate that since the conjoint meetings of 1923 great advances have been made at the seat of Federal Government. These have all been in the direction of securing for it a proud place among the leading capitals of the world.

It is to be hoped that many visitors will bring their families with them. To these will be extended hospitable welcome and entertainment through the auspices of the "Sons' and Daughters' Committee". This Committee, under the Chairmanship of Dr. F. W. Jeffrey, 162 Clemow Avenue, Ottawa, is made up of a group of energetic medical men and their wives who are looking forward enthusiastically to greeting guests. For these they have prepared a program which should appeal to persons of all ages. They hope that their efforts will be rewarded by a large registration of young people. Items on the program include a city tour which will extend over thirty-five miles of Government Driveway, visits to the Royal Mint, Dominion Archives, National Gallery, and the Parliament Buildings. Other sight-seeing tours are also being arranged for, as well as boat excursions, garden parties, golf, tennis, swimming, dinners, teas, and dances.

The several hospitals of the city are well worthy of inspection and will be open for this purpose at all times throughout the week of the convention. The two leading hospitals, the Ottawa Civic, and the Ottawa General, are among the largest and best equipped in the country, and are usually filled to capacity with cases which encourage the academic study of disease. For the convenience of those who might wish to attend routine clinical ward rounds or surgical operations bulletins indicating the nature of these will be posted daily at the Convention Hotel.

It is urged, once again, that all prospective visitors to the convention should secure their hotel accommodation without delay. Should advice or assistance be required in this connection the Chairman of the Housing Committee, Dr. J. H. Alford, 235 O'Connor Street, Ottawa, will be only too glad to be of help. The schedule *re* Hotel accommodation which appeared in the February issue of the *Journal* should be consulted by those who have not yet secured reservations.

Hospital Service Department Notes

Charging Doctors for Hospital Cases

At a recent regional hospital convention in one of our provinces a resolution was presented favouring a ruling among all municipal hospital boards that doctors practising in such hospitals be required to pay ten cents per patient day for all patients in the hospital under their care. This resolution, which would cover both private and non-paying patients, was based upon the "whereases" that municipal hospitals are built, equipped and staffed at the expense of the ratepayers, and that doctors, whilst contributing nothing towards such cost, use these hospitals for the furtherance of their practice, and benefit to the extent to which such hospitals are equipped and staffed. The resolution was lost.

The viewpoint expressed by this resolution crops up every once in a while. It is sometimes advanced when fund-raising campaigns are in progress, it being claimed that the hospitals are being financed largely for the doctors' benefit. Those holding such views, and they are much in the minority, overlook entirely the fact that the patients are the real beneficiaries, and that, if the hospital enables the doctor to do finer work and get better results, it is really his patient who gains. It is quite true that the doctor's work is made easier by the hospital, particularly in surgery and obstetrics, and that these facilities are often provided for him without his effort, but he contributes in many ways. Doctors give a tremendous amount of service to the hospital without reward, attending non-paying patients, looking after nurses and maids, lecturing to the nurses if there be a training school, serving on various hospital committees, etc. Moreover, in the case of the municipal hospitals the doctors have usually contributed heavily, as most doctors are property-owners. In this particular province most doctors look after their own non-paying patients in the public wards, and the adoption of such a measure would probably mean a natural disinclination on the part of the doctors to assume the gratuitous care of these poor patients—and pay for the privilege.

Government Specifications for Clinical Thermometers

Specifications applying to clinical thermometers have recently been issued by the Canadian Government Purchasing Standards Committee. These require that the thermometers, whether with long or short bulbs or of rectal type, shall be not less than 9.5 cm. nor more than 10.5 cm. in length. Stems shall be of "lens-front" section with a white enamel back, and give a very clear image of the mercury column. Bulbs shall be of special thermometric glass, and shall have certain specified dimensions. The constriction must be of such type that the column is fixed by it in various positions and at certain temperatures, and yet must permit the mercury to shake readily through it when the thermometer is being reset. The thermometers must be graduated continuously from 95° F. to 108° F., the graduations covering not less than 3 cm. Detailed specifications are provided with respect to the type of graduation and the figuring of the scale.

The performance requirements are definitely defined. Up to 106° F. the maximum error must not be greater than plus or minus 0.2° F. Above 106° F. it shall not exceed plus or minus 0.3° F.

Thermometers may be rejected for greater scale corrections, for sticking and erratic behaviour, for retreating by more than 0.2° F. when cooled after warming to maximum reading, and for failure to throw down the index to 96° F. in the spinning test. Markings shall be tested for permanency by immersing for one minute in a 5 per cent aqueous solution of phenol of a temperature of 158° F.

As there is considerable variation in the dependability of thermometers available on the market, specifications of this type are of real value. Any enquiries regarding specifications issued by the Canadian Government Purchasing Standards Committee should be addressed to the Secretary of the Committee, National Research Committee, Ottawa.

Medical Societies

The Calgary Medical Society

Each year for several years Dr. A. H. Baker, Superintendent of the Provincial Sanatorium at Keith, has invited the members of the Calgary Medical Society to hold a regular monthly meeting at this institution. At each of these meetings tuberculosis has been discussed in some of its phases by members of the staff. This year on March 9th, Dr. Baker presided during the scientific discussion. Dr. J. C. McPherson discussed the use of tuberculin as a diagnostic test. Dr. A. A. Stevens spoke on artificial pneumothorax, illustrated by x-ray films. Dr. G. Reed

gave a practical demonstration and lecture on the induction of pneumothorax. Dr. A. H. Baker gave a short address on the diagnosis of early tuberculosis. He emphasized the importance of a thorough examination of those who had been living in contact with known tuberculous patients.

G. E. LEARMONTH

The Ontario Neuro-Psychiatric Association

This Association at its meeting in London on March 18th, celebrated the centenary of the birth of the late Doctor Richard Maurice Bucke, first superintendent of the Ontario Hospital at London. Tribute was paid to Doctor Bucke's pioneer work in the care of the mentally defective of this province. Members of Doctor Bucke's family were present. There was also on exhibition a collection of books from Doctor Bucke's library, some of his own articles, and some of the articles of Walt Whitman to whom he was a library executive. Among the friends of Doctor Bucke who were present were Drs. Solon Wolverton, W. E. Saunders and W. C. Herriman, the latter having been associated with him in his hospital work.

J. H. ELLIOTT

Prince Albert and District Medical Association

At the March meeting of the Prince Albert and District Medical Association, Dr. George H. Lee presented an unusual case of bone disease with destructive lesions in both femurs, both tibias and the skull, which is as yet undiagnosed. An outstanding internist who saw the patient, and an orthopaedic surgeon and a radiologist who reviewed the physical findings and the x-ray plates, were in favour of a diagnosis of osteitis fibrosa cystica in spite of normal blood calcium, with atypical osteomyelitis as a possibility. Three pathologists studied the material removed at operation of two of the lesions. One gave a diagnosis of endothelioma, the other two, of low grade osteomyelitis. Arrangements are being made for further study, including the calcium and phosphorus balance.

Two surgical moving pictures were also shown.

Post-Graduate Courses

Children's Memorial Hospital, Montreal

The Staff of the Children's Memorial Hospital, Montreal, will repeat the post-graduate course in the Medical and Surgical aspects of the Diseases of Children during the week of September 13th next. The course which was given last year met with unusual success. Many more applicants were received than could be accepted. It is expected that this year applica-

tions will again far exceed the limited accommodation available. Those desiring to apply for the course are urged to do so without delay.

The registration fee is \$15.00. This will include daily lunches at the Hospital for the duration of the course as well as other entertainment including a dinner at the Faculty Club, when a prominent speaker will be the guest.

University of Toronto Faculty of Medicine

The University of Toronto, Faculty of Medicine, offers to graduates in Medicine two courses of one week each commencing Monday, September 20, 1937.

This course on Physical and Manipulative Therapy will consist of:

- (a) The presentation of cases showing the clinical conditions requiring these forms of treatment;
- (b) Demonstrations of the methods used;
- (c) Discussions of the indications for each of the methods.

This course on Cardiovascular Disease will consist of theatre and bedside clinics and practical work in the wards of the Toronto General Hospital.

Each of these courses will be limited to 20 and will only be given if at least 10 practitioners signify their intention of attending.

Applications will be received up to August 15th. Write to the Secretary, Faculty of Medicine, University of Toronto.

The fee for each course is \$25.00.

Vancouver Medical Association

SUMMER SCHOOL CLINICS

JUNE 22 TO JUNE 25, 1937, INCLUSIVE

Dr. Wm. Boyd, M.R.C.P.(Edin.), F.R.C.P. (Lond.), F.R.S.(C.), Professor of Pathology, University of Toronto, Toronto.

Dr. Harold Brunn, F.A.C.S., Clinical Professor of Surgery, University of California, Berkeley, California.

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Abstracts from Current Literature

Surgery

Gastroscopy. Taylor, H., *Brit. J. Surg.*, 1937, 24: 469.

Gastroscopy was first attempted by Kussmaul in 1868 and improved through the years, until we now have the Wolf-Schindler flexible instrument. The instrument is described in detail. The patient has no breakfast; omnopon-scopolamine is given one and a half hours beforehand. The mouth, pharynx and œsophagus are anaesthetized by 5 c.c. of 2 per cent percaine together with 5 drops of 1:1,000 adrenaline. The patient is placed on his left side and his head supported between the two hands of an assistant. The instrument is passed without force, but rather it is swallowed by the patient. If any obstruction is encountered this is due to organic lesion and no attempt made to force it by.

Contraindications for its use are—severe illness, especially if associated with dyspnoea; carcinoma or stricture of the œsophagus; gross curvatures of spine; aneurysm of aorta; intrathoracic neoplasm; cirrhosis of the liver; heart failure, etc.; after recent hæmatemesis; possibility of air embolism, and during exacerbation of ulcer pain, for fear of perforation. A description is given of the endoscopic appearances in the normal and diseased stomach.

In gastritis the value is in making a diagnosis early so that prophylactic measures can be taken to prevent ulcer formation; also, to rule out other conditions such as carcinoma. The value of gastroscopy in ulcer is not only for exact diagnosis but also for the direct observation of an ulcer under treatment. Supervention of a malignant change cannot always be diagnosed by the gastroscope in chronic ulcer, but repeated observation can show the possibility of malignancy. Gastroscopy is of special value in gastrojejunal ulcer, because other methods of diagnosis such as the test meal and x-ray give little information.

X-ray is not displaced by the gastroscope. It shows the size, shape, position, movements, gross filling-defects or deep ulcers. Gastroscopy shows the character of the mucosa, e.g., inflammation, hyperplasia, atrophy, hæmorrhages or erosions, etc. The author gives records of 60 cases of gastroscopy.

S. A. McFETRIDGE

Small Bone Repair. Speed, K., *Surg., Gyn. & Obst.*, 1937, 64: 9.

Physiological explanations of clinical observations on healing of the bones of the hand and foot comprise the text of this paper. Provided that calcium absorption in bone can be watched for by repeated x-rays, Speed believes all small bones will heal with prolonged immobilization, and this is particularly true in carpal fractures.

Repair of bone may be arrested in any one of its several stages. He has sometimes found it necessary to remove cartilages in order to allow for the formation of bone. He reports observations on the scaphoid and trapezium (greater multangulum). In one scaphoid case two drill-holes were made in the lateral fragment. One hole was directed into the capitate and the bone insert there placed; the other hole was continued into the medial fragment of the scaphoid. In due course, with prolonged immobilization, complete bony union occurred in the scaphoid, while the bony insert was absorbed to a great extent. In the os scaphoid it is a difficult problem to settle whether inserts of medullary bone with endosteum or the stimulation of the slightly hyperæmic area about the drill-hole with subsequent progressive stages of bony deposition, plus the inhibition of movements which traumatized the slightly hyperæmic edges of the fragments, are responsible for the revivifying of the opposing (fractured) surfaces. Most small bone injuries are healed, clinically, several weeks before satisfactory x-ray evidence is available.

FRANK DORRANCE

Treatment of Fractures. Further Observations on the Use of Splenic Extract. Wheeldon, T., *Surg., Gyn. & Obst.*, 1936, 63: 761.

Having obtained markedly favourable results in the healing of bone and joint tuberculosis and of acute and chronic osteomyelitis, the author reports his experiences with 45 fracture cases, consisting of 5 series of ununited, poor-position, fragilitas ossium, splenic extract with crutches only, and fresh fractures with splenic extract diet only, respectively. The rapidity of healing and the solidarity of the callus bespeak a trial of the splenic extract diet in fractures.

FRANK DORRANCE

Osteomyelitis of the Bones of the Hand. Koch, S. L., *Surg., Gyn. & Obst.*, 1937, 64: 1.

Infection of bone following infection of the soft tissues is of greater frequency and importance in the hand than elsewhere. The author considers three principles as essential in the treatment. Adequate drainage is the first and most important. Aseptic technique should be rigorously adhered to. Avoidance of trauma to infected and healthy tissue precludes the use of the curette, strong chemicals, and frequent dressings. Koch is a firm disciple of conservative treatment in injuries and in infections of the hand. He places the onus on the surgeon when calcium absorption and atrophy as a result of immobilization are reported by the roentgenologist as inflammation in bone.

FRANK DORRANCE

Obstetrics and Gynæcology

Birth Injury in Relation to Labour. Holland, E., *Am. J. Obst. & Gyn.*, 1937, 33: 1.

The thin, plastic and incompletely-closed cranium of the human fetus gives very poor protection. The problem of birth injury is mechanical, but prematurity and asphyxia are important predisposing factors. The stresses and their effects vary chiefly with the absolute amount of the forces acting on the head at any given time, the direction in which these forces act on different parts of the head, the degree of plasticity of the head, whether the forces exert their maximum effect suddenly or gradually, and the length of time they act. Excessive stress may result in excessive alteration in the shape of the head, overstretching and tearing of the dura mater septa and rupture of certain blood vessels, thereby causing a rise in intracranial pressure sufficient to obstruct the venous sinuses and cerebral veins and to produce cerebral congestion and œdema. In Holland's series of 167 consecutive cases of intranatal fetal death tentorial tears were found in 48 per cent. There were 46 cases of head presentation and 35 cases of breech presentation. In the head cases forceps was used in 25 cases. Tentorial tears were found in no less than 75 per cent of the breech labours. The use of a short light forceps (Wrigley's design) is recommended for outlet forceps operations. Holland does not approve of the prophylactic forceps operation, and considers that, so far as the child is concerned, induction of premature labour should be restricted to cases of real necessity, since F. Brown has proved that cerebral hæmorrhage is sixteen times more frequent in premature than in mature babies.

ROSS MITCHELL

The Friedman Test in Hydatidiform Mole and Chorion-epithelioma. Lazarus-Barlow, P., *Brit. M. J.*, 1937, 1: 71.

The Friedman test was used (1) to establish the presence of a hydatidiform mole or a chorion-epithelioma; (2) as a criterion of the complete removal of a mole or the presence of a subsequent chorion-epithelioma; and (3) as evidence of the absence of secondary deposits after hysterectomy for chorion-epithelioma. Case 1 showed clearly the value of the test in revealing early those cases of hydatidiform mole which pass on to chorion-epithelioma. Case 2 showed the value of the test in confirming the complete removal of the mole, and in disproving any pathological significance in the brownish discharge seven months after a mole had been passed. Case 3 showed the value in indicating the complete removal of the uterine tumour and the absence of any secondary deposits. Case 4 was interesting in showing the rapidity with which the test became negative after the com-

plete removal of a mole, and also showed the value of intravenous Congo-red in preventing hæmorrhage. In Cases 1 and 3 panhysterectomy was performed, mainly on the results of the Friedman tests, and in each case this course was completely justified.

ROSS MITCHELL

The Relations of After-pains to Uterine Contractions Following Administration of Progestin. Lubin, S., Clarke, F. J. and Reynolds, S. R. M., *Am. J. Obst. & Gyn.*, 1937, 33: 143.

After-pains may be relieved by intramuscular injection of 1 rabbit-unit (Corner-Allen) of progestin. Relief of pains begins before any significant alteration in uterine contractions as revealed by the external hystero-graphic method of recording. After consideration of the mechanism of production of after-pains and the nature of the relief from them following progestin administration it is concluded that the relief of pain is associated with complete or relative prevention of ischæmia within the uterus during a portion of the contraction phase.

ROSS MITCHELL

Pædiatrics

Chronic Miliary Tuberculosis in Children. Fish, R. H., *Arch. Dis. Child.*, 1937, 12: 1.

A review of the literature reveals quite a large series of cases of chronic miliary lesions in the lungs of children, many of which have been proved to be tuberculous. A few of these have recovered. Only five cases have been reported in British journals.

The diagnosis of miliary tuberculosis is not infrequently made on insufficient evidence. There are a number of conditions, such as pneumoconiosis, carcinomatosis, bronchopneumonia, bronchiolitis, chronic vascular congestion and disseminated blood, etc., which are liable to produce similar x-ray shadows. The author reports 10 cases of chronic miliary tuberculosis in children admitted to High Wood Hospital in the past four years. This hospital admits all children with pulmonary tuberculosis requiring institutional care under the London County Council tuberculosis scheme.

Of the cases reported 6 were fatal and 4 recovered. Five of the fatal cases were proved to be tuberculous by autopsy, and in the sixth, tubercle bacilli were demonstrated in the sputum. Death occurred five and a half to eleven months after the disease was recognized, and in two cases temporary clinical improvement was noted. At autopsy both healed and healing lesions were found in the lungs as well as multiple tubercle bacilli. In the 4 patients who recovered the diagnosis was confirmed by the demonstration of tubercle bacilli either in the sputum or stomach washings in every case. All of these showed some form of extra-pul-

monary tuberculous lesion, thus providing strong evidence of hæmatogenous spread. All the cases showed chest films typical of miliary tuberculosis, and pleural effusion occurred in 4 of the series. The Mantoux test was strongly positive in all 10 cases. There seems to be no fine line of distinction or difference in the pathological picture between the acute and the chronic forms of miliary tuberculosis.

ALAN ROSS

Ophthalmology

Pathological Ocular Hypotension. Magitot, A., *Ann. d'Ocul.*, 1936, 173: 785.

In spite of imperfections the tonometer may be used for taking the normal tension, bearing in mind a high and a low limit. This is approximately 10 mm. Hg., but we must not consider this figure an absolute value. In other words, the ocular tension must always be compared with the general arterial pressure.

There are three influences which modify the ophthalmic tension—the local circulation, substances circulating in the blood, and the nervous system. The results of these influences may be found singly, but oftener they are combined.

Certain hypotensions are due to congenital malformations; others are due to familial myopia, but hypotension in myopia is not the rule. Among the traumatic hypotensions we find those that follow trauma in the ciliary region, burns of the limbus, contusions, and those that are caused by surgical intervention on the globe. Hypotension in detachment of the retina is far from constant. It is frequent, and does not appear to be linked to the myopia, and when it does appear it causes a profound disorganization of the ocular membranes. In infections and toxæmias hypotension is frequent, and here we meet with the problem of hormonal influences. Nervous influences constitute a very important factor in hypotomy, but what we have called transitory or essential ophthalmomalacia has become rare since the tonometer has come into use.

S. HANFORD MCKEE

Contribution to the Surgical Treatment of Congenital Coloboma of the Lids. Charamis, J., *Ann. d'Ocul.*, 1936, 173: 810.

Congenital coloboma of the lids, a rare malformation, was first described at Montpellier in a thesis by Mayer in 1808. A more thorough study was published for the first time in England by Wylde in 1862. Interesting are the reports by von Hippel in 1907 and Pagenstecher in 1912. Among recent reports the writer cites that of Van der Hove in 1921.

A general description of coloboma is given and the different theories to account for it. The writer describes a case which he had followed from birth—a baby girl who was ex-

amined for the first time at six months, and then again at nine years, without having had anything done in the meantime. The father had syphilis, for which the child was given specific treatment. The coloboma was present without any other congenital anomalies. The cornea was intact, although it was completely uncovered with the lids closed and so was continually exposed and without protection. The coloboma occupied nearly the whole width of the upper lid and extended practically to the limits of the tarsus. However the movements of the upper lid were conserved, despite this.

As regards etiology the author thinks syphilis should be taken into serious consideration. This accords with the theory of van Duyse. The treatment of all palpable colobomas should be surgical. Sometimes a simple drawing together of the border suffices; for those of greater width blepharoplasty operations are necessary. The correction of the above case is described in detail, and the article is illustrated with five photographs.

S. HANFORD MCKEE

Concerning a New Medication in the Treatment of Trachoma, "Trachocid". Lobel, A., *Ann. d'Ocul.*, 1936, 173: 734.

Those who work with trachoma in infected regions know how obstinate this disease is against all known treatment. Since Brecher in 1935 published his observations on the use of "Trachocid", the author has been experimenting with this agent.

"Trachocid" is derived from an animal toxin ("immenin" of Kretschy and venom of the serpent) rendered completely atoxic and non-irritating by a special chemical process. The author has used trachocid in 8 cases, and, he believes, with complete success. The only exception was a case with old pannus; all the others improved rapidly with striking cure.

The technique of the injections is simple. After anaesthesia of the bulbar conjunctiva with adrenalin and cocaine, trachocid is injected around the limbus, and if we wish to use it on the palpebral conjunctiva we inject the superior or inferior cul-de-sac. These injections may be done daily or every second day up to 15 injections.

S. HANFORD MCKEE

Urology

Infections of the Urinary Tract of Obscure Etiology. Cook, E. N., *J. Urol.*, 1936, 36: 460.

The author is of the opinion that there is a group of cases of severe inflammatory processes in the urinary tract, non-tuberculous in nature, in which it is impossible to demonstrate by repeated cultures and Gram's stain the causative organism. Such cases are too frequently diag-

nosed as tuberculosis of the urinary tract, even when corroborative evidence cannot be obtained from cystoscopic and urographic data. The local symptoms are well marked and are of severe nature, considerably more severe than those seen in the commoner infections of the urinary tract, and more prolonged. Frequently dilatation of the pelves, calyces and ureters will suggest an inflammation of long standing. Since the condition in such cases responds to the same treatment which proved successful for infections of known origin it seems that this condition is infectious in nature. Attention is likewise called to the importance, in addition to local and general measures of treatment, of removing foci of infection.

J. V. BERRY

Primary Carcinoma of the Seminal Vesicles.

McNally, A. and Cochems, F., *J. Urol.*, 1936, 36: 532.

The experience of urologists with primary carcinoma of the seminal vesicle is limited. Sixteen instances of primary carcinoma of this structure have been reported, of which 4 are definitely proved. The symptoms of carcinoma of the seminal vesicle are those of lower urinary tract obstruction, i.e., frequency of urination, with gradual diminution in the size and force of the urine stream, progressing to retention with overflow. Deep-seated pelvic pain and hæmaturia are the two most constant symptoms noted in the collected reports. The diagnosis of carcinoma is based upon the presence of a large hard nodular mass in the region of the involved vesicle.

Treatment depends upon the extent of the involvement. Complete surgical extirpation, if feasible, is the most desirable, preceded and followed by deep roentgen therapy.

The authors report a case alive and well two years after vesiculectomy. It was interesting to note that excised prostatic tissue revealed a tuberculous infection of the gland.

J. V. BERRY

Behaviour of the Human Bladder Freed from Cerebral Control. Langsworthy, O., Lewis, L. and Dees, J., *J. Urol.*, 1936, 36: 577.

The authors have studied the dynamics of bladder function in a group of cases with hemiplegia, both unilateral and bilateral, and with lesions of the motor tracts in the spinal cord. They conclude that the stretch reflex in the bladder muscle, like reflex activity of voluntary muscle, is overactive when released from cortical control. The bladder empties precipitately upon a small volume of fluid. In the cases where the motor pathways from the midbrain are injured bilaterally, along with the cortico-spinal tracts, the waves of bladder contraction are of much less amplitude and reflex bladder emptying is much less efficient. It is interesting to note that vesical abnormalities were more

marked in right-handed patients with right hemiplegia than in those with left hemiplegia. One hemisphere appears to be dominant in vesical control.

J. V. BERRY

Dermatology

Cancer of the Lip. Wile, U.-J. and Hand, E. A., *J. Am. M. Ass.*, 1937, 108: 374.

The authors review 425 cases followed from one to ten years, chiefly from the viewpoint of comparing methods of treatment.

They divide carcinoma of the lip into the papillary type, usually beginning in a keratosis or leukoplakia, ulcerating late, ordinarily classified in Broders' types 1 and 2; and the ulcerative infiltrative type, commonly beginning from a fissure, ulcer or minor injury, metasisizing early and with much worse prognosis.

Of the cases 96.4 per cent were in males. The impression obtained from the small number of female cases was that prognosis in them was better. Of all cases 93.3 per cent occurred on the lower lip. In contrast to the general belief the authors found in their series that the younger age-groups fared better than the older. Syphilis was found in 4 per cent of the group, the same proportion as found in the general admissions to the hospital. Syphilis appeared to be of no great importance as an etiological factor, an interesting contrast to its significance in cancer of the tongue. In 32 per cent there was a moderate to excessive use of tobacco, but the percentage of tobacco-users was believed to be much higher, and it was concluded that the greater prevalence of smoking, particularly pipe-smoking, accounted for the great preponderance in males.

Two hundred and eighty-six previously untreated cases were treated by one or other of the following methods: (1) surgical excision (30 cases); (2) surgical excision plus roentgen or radium therapy (20 cases); (3) surgical excision plus dissection of the cervical lymph nodes (25 cases); (4) surgical excision plus dissection of cervical lymph nodes plus roentgen or radium therapy (29 cases); (5) roentgen or radium therapy (46 cases); (6) local destruction (83 cases); (7) local destruction plus roentgen or radium therapy. From a comparison of those cases treated by surgical excision alone with those in which it was followed by radiation, the conclusion was reached that subsequent radiation therapy was unnecessary.

Since it is impossible to make a definite clinical diagnosis of metastatic nodes in cancer of the lip except in far advanced metastases with fixation, enlarged nodes being more often due to secondary infection than to metastasis, it was held that palpable lymph nodes in all operable cases should be dissected. From comparing groups with and without roentgen therapy to the regional nodes it was concluded that roent-

gen therapy of lymph nodes is useless as a prophylaxis against metastasis.

Results with local destruction compared very favourably with radium alone or surgery alone, and much better than with roentgen therapy alone. The methods of local destruction employed were curette and actual cautery; curette and chemical cautery; electrodesiccation of the local lesion and from one-quarter to one-half an inch of normal lip; adequate removal with the cutting followed by cauterization. This method was highly recommended as entailing no loss of time from work, hospitalization or expensive equipment, and giving excellent cosmetic and functional results. Some of these advantages also attached to radium therapy, but, as with roentgen therapy, this was dangerous in unskilled hands, the equipment necessary was expensive, and with the latter method secondary results due to radiation were frequently a severe drawback.

D. E. H. CLEVELAND

The Pathogenesis of Hysterical Skin Affections.

Haxthausen, H., *Brit. J. Dermat. & Syph.*, 1936, 18: 563.

The hypothesis has gained acceptance that the skin of hysterical persons reacts in an abnormally severe manner towards various forms of external irritation, by virtue of a peculiar sensitivity of presumably vasomotor dependency. There appear to be very few recorded observations in direct confirmation of this. Of the three referred to one is by the late F. J. Shepherd, of McGill.

The author, in an attempt to obtain further support for this view investigated a series of 8 patients who had pathomimia (hysterical lesions of external traumatic origin). In all of them other hysterical lesions were also present; mental changes, diminished or absent corneal or pharyngeal reflexes, sensory disturbances, globus, etc. The skin of each patient was subjected to a series of irritants both chemical and physical. The tests were selected on account of the absolutely uniform qualitative reaction induced by them upon the normal skin of different individuals. In no single instance with any of the tests employed, did a reaction occur to be distinguished qualitatively from corresponding reactions in normal persons. No reactions were abnormally severe or particularly persistent. The author concludes therefore that there is no increased responsive capacity of the skin in patients with pathomimia.

D. E. H. CLEVELAND

Neurology and Psychiatry

Insulin Shock Therapy in Schizophrenia. Steinfeld, J., *J. Am. M. Ass.*, 1937, 108: 91.

Though describing but 3 cases the author presents a thoughtful critical addition to the rapidly accumulating literature on this form

of therapy. He stresses particularly the grave risks involved and the imperative demand for the constant presence of physician and nurses. The emphasis placed on the wide deviations from the so-called "typical" reactions is also worthy of note. Finally, the author's suggestion that some central clearing house be created to sift the data from all available sources seems most worth while. The interest aroused in any possible form of attack on an entity so prevalent as schizophrenia is world-wide, and if, as appears likely, there be some real value in this method valid information must be disseminated with the least possible delay.

G. N. PATERSON-SMYTH

Porencephaly: Diagnosis and Treatment. Pat-ten, C. A., Grant, F. C. and Yaskin, J. C., *Arch. Neurol. & Psychiat.*, 1937, 37: 108.

Porencephaly is defined as a defect in the cerebral or cerebellar structure appearing as a cyst-like cavity communicating with the ventricles or separated from them only by a thin layer of brain tissue, covered on the outside by the pia-arachnoid and filled with a clear, colourless fluid. The problem presented in each of the 9 cases reported was the cure of convulsive seizures. Symptomatic treatment by dehydration, luminal, or bromides had given little relief. A constant clinical picture was noted; failure of development of one-half, or part of one-half, of the body, accompanied by weakness of the upper motor neuron type, unilateral sensory disturbances, and Jacksonian fits. The final diagnosis was usually established by encephalography. In 8 of the 9 cases the cyst was in the left cerebral hemisphere. Operation was performed on 8 patients. The surgical attack consisted of excision of the roof of the cyst and interference (by partial excision or clipping of blood supply) of the adjacent choroid plexus. Of the 6 surviving patients 3 had complete relief from convulsions, while the other 3 showed marked improvement. The cases have been followed for four years. No satisfactory explanation has been offered for the occurrence of convulsions in these cases nor for the good results of the surgical treatment.

FRANK TURNBULL

Therapeutics

Treatment of Fractures of the Neck of the Femur by Internal Fixation. Smith-Petersen, M. N., *Surg., Gyn. & Obst.*, 1937, 64: 287.

The author has continued the work begun in 1925 and reported as a preliminary study in 1931. He has incorporated in his technique the work of Westcott, Thornton and Sanderson, and White. Reduction is performed by Leadbetter's method of traction in flexion of the thigh, followed in rapid succession by internal rotation, adduction and extension. Smith-Petersen's present technique is presented in full detail.

With early cases he allows time for full recovery from immediate effects of the injury and for thorough examination of the patient. Antero-posterior and lateral roentgenograms of the neck are used during the insertion of the pin. He has become more insistent on gentle impaction in valgus position. Suspension with 5 pounds traction and early movement in the foot, knee and hip, for one month is advised. A bivalved spica bandage is used for walking for the first 8 weeks, with crutches for the first 6 months. The nail is never removed before one year. He is sceptical of recent reports on the use of wires, pins, screws and bolts, inasmuch as many of them have not allowed 24 months to elapse before reporting end-results.

FRANK DORRANCE

The Prevention of Post-operative Jejunal Ulcers by Diet and Fundusectomy. An experimental study in Dogs. Fauley, G. B. and Ivy, A. C., *Surg., Gyn. & Obst.*, 1936, 63: 717.

The special diet consisted of a high percentage of nuclear substances, vitamins and readily-assimilable carbohydrates. The experiments hypothecate the importance of the removal of a large portion of the secretory tubules and of a readily digestible diet in lessening the amount of free acid available for action on the stoma of a Mann-Williamson operation and in lessening the duration of time during which the available acid may act, respectively. The authors find and believe that fundusectomy or special diet alone has not much to offer in the clinical field.

FRANK DORRANCE

Treatment of Abdominal Trauma. Metz, A. R., Householder, R. and De Pree, J. F., *Surg., Gyn. & Obst.*, 1937, 64: 378.

As industrial surgeons the authors insist on immediate hospitalization of all abdominal injuries of any other than the slightest direct violence. Thorough history of the injury, complete physical examination, complete blood count, microscopic urinalysis, and two direction x-rays are done on admission. A check-up is made at half-hour intervals. Lateral x-rays are made to define the presence of free air. Operation, if necessary at all, should be performed within 4 hours.

FRANK DORRANCE

Pathology and Experimental Medicine

Galactose Tolerance in Hyperthyroidism. Althausen, T. L. and Wever, G. K., *J. Clin. Investigation*, 1937, 16: 257.

Impaired tolerance to dextrose is found in about one-half of patients with hyperthyroidism. Since the cause of the reduced sugar tolerance in the hyperthyroid state remains unsettled, the authors endeavoured to obtain more information on the subject by studying the response to galactose in patients with this disease. They found that the curve of galactose in the blood

after the oral administration of this sugar is considerably higher in patients with hyperthyroidism than in normal or diabetic subjects. Thyroidectomy, in most cases, restores to normal the tolerance for galactose. Accelerated intestinal absorption or impaired utilization of galactose by the liver in hyperthyroidism probably accounts for this phenomenon. Reduced tolerance to galactose is such a consistent finding in hyperthyroidism that the authors believe it may prove to be of value in differential diagnosis.

JOHN NICHOLLS

The Effect on the Kidney of Bilateral Splanchnicectomy in Patients with Hypertension.

Freyberg, R. H. and Peet, M. M., *J. Clin. Investigation*, 1937, 16: 49.

The authors report the results in 48 cases of hypertension in which they carried out a surgical procedure devised by one of them (M.M.P.), consisting in bilateral sectioning of the major and minor splanchnic nerves and of the lower dorsal sympathetic chain, including the 10th, 11th and 12th ganglia, supradiaphragmatically. The effects of this operation were assessed by means of measurement of renal function and urinary abnormalities, and the correlation of this with changes in the blood pressure. The procedure mentioned greatly relieved the hypertension in some cases, benefited others to a lesser degree, and did not influence the blood pressure in some others. In general, the changes in the kidneys were associated with changes in the blood pressure. In those patients who had a significant and maintained decrease in blood pressure urinary abnormalities decreased or disappeared, and the renal function, if it had been impaired, improved; in several cases the latter became entirely normal. In a few cases, with less decrease in blood pressure, renal function remained unchanged. When hypertension was lowered in patients having normal renal function the efficiency of the kidneys remained normal. When hypertension was not favourably influenced renal function remained unchanged, or gradually became worse, as would be expected in patients not operated on. These observations show that in cases of primary hypertension satisfactory renal function is not dependent on high blood pressure; that hypertension is not compensatory to measurable renal damage; that marked impairment of renal function may accompany hypertensive vascular disease; and that striking improvement of renal function follows relief of hypertension brought about by splanchnicectomy.

JOHN NICHOLLS

Staphylococcal Immunity. Kitching, J. S. and Farrell, L. N., *Am. J. Hygiene*, 1936, 24: 268.

A comparison is made of the effectiveness as an immunizing agent of staphylococcus forma-

linized vaccine and of toxoid against parentally introduced living staphylococci and their filtrates. It was found that active immunization of rabbits and mice with toxoid produced increased resistance against staphylococcus and staphylo-toxin, and also against the latter given intradermally in rabbits (dermo-necrotic effect). On the other hand, the vaccine induced no resistance against the same agents. Also, no antitoxin was formed after the vaccine such as there is after the toxoid. As regards passive immunity the serum obtained from the rabbits injected with vaccine did not confer resistance, whereas that from the animals injected with toxoid did, the antitoxin being a specific agent for protecting against both living staphylococci and their toxins. Delay in the administration of antitoxin distinctly lessened its value.

A. BRANCH

Hygiene and Public Health

Adult Immune Serum in Measles Control.

Blackler, C. F., *Canad. Public Health J.*, 1936, 27: 587.

Since by far the great majority of deaths directly or indirectly the result of measles occur in young children under five and especially under two years, any means that will either postpone or mitigate an attack would be worth while. It is becoming apparent that few escape having the disease at some time. Communicability decreases rapidly after the 3rd or 4th day. Convalescent serum can prevent measles, but there is some variation in potency and consequently in the dosage. The course of the disease, also, can be modified by this means, leaving a permanent immunity. Serum given before the sixth day produces passive immunity lasting 12 days. Thus if children are in the dangerous age protection is most important. Later on modification of the course is sufficient as regards the serum; it seemed most potent when taken from adults with a history of measles many years previously. That from convalescing cases was not so good and could apparently transfer the disease itself.

The serum is given intramuscularly, the dosage ranging from 3 to 20 c.c.

P. M. MACDONNELL

Industrial Operations in Compressed Air. Singstad, O., *J. Ind. Hyg. & Toxicol.*, 1936, 18: 497.

The author, who is an engineer, gives an historical account of compressed air work and a description of modern practice. The regulations obtaining in the various states of the United States are discussed and reference is made to recent studies on the subject. A very complete review of an interesting medical process.

FRANK G. PEDLEY

Obituaries

Dr. William Robert Alway, of Waterford, Ont., died on March 25, 1937, from a "stroke". The deceased was born in Rockford, Ont. in 1871, a son of the late Fred and Mrs. (Mason) Alway. After graduating in medicine (Tor. 1897) he spent three years in England and Germany doing post-graduate work. In all he had been practising medicine for forty years, thirty-two of them being in Waterford, where he specialized in eye, ear, nose, and throat diseases, until a few years ago when he was in a bad motor accident. Since that time he has not been able to work as hard, but still was at the office as much as he was able. He was formerly M.O.H. for Waterford.

His first wife was Miss Beatrice Holmes, a niece of Dr. Holmes, Chatham, who died many years ago. Later he married Miss Katharine Marlatt, Waterford, who survives. He leaves one daughter, Mrs. Fred Wilks, Vittoria; a brother, Dr. F. J. Alway, St. Paul, Minn.; and one sister, Mrs. George W. Robertson, Edmonton, Alta.

Dr. Ralph Robert Barker, of Smith's Falls, Ont., died on March 20, 1937. He was 49 years of age and widely known throughout Eastern Ontario, having practised in Ottawa, Westport and Jasper before coming to Smith's Falls.

Dr. Barker was a son of the late John and Alice Barker, pioneer residents of the Rideau lake district. He was born near Portland, receiving his early education there. He later attended Athens' high school and entered Queen's University, graduating in 1910.

During the construction of the railway line between Smith's Falls and Sydenham Dr. Barker served as medical officer for the C.N.R. and later opened practice in Ottawa, where he remained until March, 1916, when he went overseas as medical officer with the Canadian Forestry Corps. He served through the Great War and was discharged in 1918 with the rank of major. On his return to Canada, he opened practice in Westport and remained there until 1932, when he moved to Jasper village, six miles from Smith's Falls. Failing health caused him to take up residence in Smith's Falls last fall.

Dr. Charles McIntosh Burroughs, of Sudbury, Ont., died from carbon monoxide poisoning on March 14, 1937. Dr. Burroughs was born in Shawville, Que., in 1885, but came to Sudbury as a child. He was a graduate of the University of Toronto (1911).

Dr. Alexander Neil Chisholm, of Port Hawkesbury, N.S., died of pneumonia on November 3rd. He was fifty years of age and a graduate of McGill University (1917).

Dr. Charles James Fox, of Pubnico, N.S., died on March 24, 1937. He was born at Bridgetown in 1850 and there received his early education. He taught school for several years and then attended the University of Pennsylvania from which college he received his M.D. in 1876. He then settled in Pubnico and had lived there since.

Dr. Fox was twice married; first to Maria Homer, of Barrington, and, secondly to Annie Gayton, of Lower Argyle, who predeceased him some years ago.

Dr. George Arthur Edward Kelman, of Fernie, B.C., passed away on February 21, 1937. He came to Alberta in 1912, remaining there until 1923, when he moved to Fernie and had practised there ever since. He took his medical course at Westminster Hospital, London, England, and the conjoint examination, receiving the diploma of M.R.C.S., and L.R.C.P., in 1911.

His father, Dr. George A. Kelman, a graduate of fifty years' standing, twenty-five years of which have been spent in Canada, is left to carry on the practice.

Dr. William Milton Mather, of Tweed, Ont., died on March 16, 1937. He was born in 1859 and a graduate of Queen's University (1886).

Dr. Thomas Popham McCullough, of Peterborough, Ont., died on March 18, 1937, in his 77th year. He was a graduate of Trinity College (1888).

Born at Bailieboro, son of the late Mr. and Mrs. John McCullough, Irish pioneers, he received his early education at the public school and collegiate of Owen Sound and St. Thomas. After six years at Alliston he practised in Peterborough for the past 41 years as an ear, nose and throat specialist.

He is survived by his wife, previously Sarah E. Carmichael; three sons, John, of Detroit, Thomas, of Georgia, and Hugh, of the University Club, Toronto; one brother, Dr. J. M. McCullough, previously provincial M.O.H., Toronto; and one sister, Mrs. Sarah Rogers, of Saskatoon.

Dr. Vera May Irene McDorman, aged 28 years, house physician at Providence Hospital, Moose Jaw, Sask., for the past three years, died on March 12th, after a three-days' illness.

Dr. McDorman was born at Brandon, Man. and received her medical education at the University of Manitoba. She served as interne at St. Boniface Hospital and an Edmonton hospital before coming to Moose Jaw General Hospital five years ago. She served in the General as an interne, transferring to Providence hospital three years ago.

Dr. McDorman is survived by her parents and three sisters, Jean, Doris and Margaret, at Brandon; one sister, Mrs. W. G. Peters, at Victoria; and one brother, Robert at Sudbury, Ont.

Dr. Alexander McLeod, of Wroxeter, Ont., died on March 4, 1937. He was born in 1882 and a graduate of McGill University (1914).

Dr. Harry John Quinn, of Mount Pleasant, Ont., died on March 25, 1937, in his 47th year. He was a graduate of the University of Toronto (1920).

Dr. Robert William Rooney, of Orangeville, Ont., died in the first week of April, 1937. Born near Lindsay, Dr. Rooney taught school after graduating from Orangeville Model School. He later entered Trinity College, Toronto, and graduated in medicine in 1889. For many years he practised in Shelburne and came to Orangeville in 1910. Seven years ago, Dr. Rooney was appointed M.O.H.

Dr. E. W. Rose, of Gladstone, Man., died on February 23, 1937.

Born in Kingston, Ont., November 13, 1877, he came to Gladstone with his parents in 1884, when his father was appointed postmaster. He attended school at Gladstone and St. John's College School, Winnipeg. He graduated in Arts in 1897 and from the Manitoba Medical College in 1900. He was associated for many years with the late Hon. Dr. J. W. Armstrong, and later with Dr. R. W. Warner, now of Winnipeg, and the late Dr. Layman.

Dr. Rose was mayor of Gladstone for four years, from 1910 to 1914, and at his death was a member of the town council, on which he served for 25 years. He was a member of the school board for 20 years, retiring at the end of last year; also secretary-treasurer of the Gladstone Hospital since its foundation.

He is survived by his wife, who was Elizabeth Corbett; a son, John, who is attending Manitoba Medical College; two daughters, Margaret, at home, and Dorothy,

in training as a nurse at Winnipeg; and a brother, Norman, at Fort Qu'Appelle, Sask. Mrs. C. F. Gabriel, Winnipeg, is a sister.

Dr. Morley C. Salmon died in Victoria, B.C., on March 29, 1937, in his fifty-first year.

Born in London, Ont., the late Dr. Salmon moved to Lucknow, Bruce County, Ont., when a boy. He attended the University of Toronto, graduating in medicine in 1911. Following graduation, he came to Langdon, Alta., where he practised until 1915, when he moved to Calgary. He followed his profession there until 1934, when ill-health forced him to retire to Victoria.

News Items

British Empire

Hunterian Society. Gold Medal for Practitioners.—Any registered general practitioner resident within the British Empire is eligible to compete, and the medal, which is of gold, is awarded annually to the writer of the best Essay on a subject selected by the Society.

Competitors, men or women, must be engaged in general practice and essays should be sent in by December 31st.

The essay must be unpublished and original, and be based on the candidate's own observation, but it may contain excerpts from the literature on the subject, provided that reference be made to the articles from which they are taken.

A copy of the rules and any further information can be obtained on application to the Honorary Secretary, Mr. Arthur E. Porritt, 27 Harley Street, W.1.

The subject selected for the Essay is: 1937—"The Prognosis and Care of Heart Disease in General Practice". 1938—"The Management of Inoperable Malignant Disease in General Practice".

The 1936 Hunterian Gold Medal for Practitioners was won by Dr. L. J. A. Parr, of Sydney, Australia, for his essay on "Rheumatoid Arthritis".

Great Britain

British Medical Association—Plymouth Division

The Secretary,
Canadian Medical Association,
184 College Street, Toronto.

Dear Sir,

I have been directed by the Executive Committee of the Plymouth Division of the British Medical Association to inform you that a Committee has been formed with the object of offering private hospitality to colleagues who may be visiting this country from the overseas Dominions and the United States of America during the Coronation period.

It has been observed that a great many visitors from the United States of America and the British Dominions almost invariably include in their itinerary, when on a visit to England, a tour in the very lovely Counties of Devon and Cornwall. My Committee have suggested the date of the week-end May 22nd as a suitable time to receive such visitors. Hosts would be prepared to entertain guests from Friday, May 21st to Tuesday, May 25th and it hopes, during that period, to arrange some form of collective excursion or entertainment during which hosts and guests would be enabled to meet each other.

It is felt that this suggestion, affording as it would opportunity for the visitors to be entertained in the homes of their colleagues here, may prove an

attraction and lead to a closer association between representatives of our Profession. The date selected has been chosen because at that time there are no actual official functions in London, and in all probability visitors will be quite ready to get a breath of fresh air in the country away from the Metropolis.

Of course, the numbers for this must be limited but we shall probably be in a position to provide hospitality for between 30 and 40 guests. I shall be glad to receive names of any visitors who may care to avail themselves of this Hospitality Scheme, together with their temporary addresses in this country. Steps would then be taken to put prospective hosts in touch with guests.

With compliments, believe me,

Yours faithfully,

(Sgd.) CYRIL F. MAYNE,

Honorary Secretary.

1 Queen Anne Terrace,
Plymouth, Eng.

Alberta

A special meeting of the Committee of Program and Arrangements of the Canadian Medical Association, Alberta Division, was held in Edmonton, on March 23, 1937, when the annual convention dates were fixed for September 8th, 9th and 10th in the MacDonald Hotel, Edmonton.

On the first day the Board of Representatives will meet, followed by the annual meeting of the College of Physicians and Surgeons. The following two days will be given up exclusively to scientific papers. It is expected that two Eastern speakers will accompany the President and Secretary of the Canadian Medical Association. Arrangements are being made to use moving picture films and to have a series of ten-minute talks on various therapeutic agents. An endeavour is being made to have an exhibit of physicians' hobbies. The Association is making a place on the program for the holding of Alumni Association gatherings. The matter is being entirely left with various Associations as to these meetings. Our rural Health Units have been established five years, and Dr. G. M. Little, in charge of the Red Deer Unit, will review the work and present conclusions. This is quite appropriate as the Provincial Government is providing for the establishment of three additional units.

An Act has been presented in the Alberta Legislature amending the Pharmaceutical Act, which is looking towards a closer control of the sale of codeine, and hereafter no person shall sell, offer to sell, or furnish or dispose of any capsule, pill or powder, containing more than one-eighth of a grain of codeine; nor shall he sell any liquid intended to be taken as medicine which contains more than one-eighth of a grain of codeine per gram.

A clearer definition of a "mental defective" is placed in the Mental Defectives' Act, and reads as follows:

"(a) 'Mentally defective person' shall mean any person in whom there is a condition of arrested or incomplete development of mind existing before the age of eighteen years, whether arising from inherent causes or induced by disease or injury."

An amendment to the Mental Diseases Act strikes out the words "or is an addict", so that now no addict can be taken before a Justice for an inquiry as to whether he is dangerous to be at large.

The President-elect of the Alberta Division, Dr. J. K. Mulloy, of Cardston, is planning a tour when he will visit the various District Societies throughout the province. He will have accompanying him some man to give scientific papers, and a representative of the Council of the College of Physicians and

haemolytic streptococcal infections . . .

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PHYSICIANS' CORRESPONDENCE INVITED

* Partial Reference List—

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Biological and Pharmaceutical Chemists

Surgeons. It is expected that the District Associations will have their annual elections at this time.

G. E. LEARMONTH

British Columbia

The President of the Royal Jubilee Hospital Board of Directors, Victoria, announces that the Provincial Government has been asked to increase hospital grants by nearly \$500,000 a year by creating a special fund to meet future building requirements in the province. This special grant earmarked for capital expenditure of all hospitals would do away with the haphazard method of special grants to individual institutions. Under the proposed plan all hospitals would receive an additional fixed rate ranging from 10 cents to 50 cents per patient per day according to the size of the institution. Hospitals with less than ten beds would receive 10 cents a day for each patient, and hospitals with a capacity of more than 300 beds would receive 50 cents a day. Earlier this week a delegation from the Jubilee Hospital sought Government aid to construct a \$300,000 wing, but was informed no money was available.

The construction of a wing at the Provincial Royal Jubilee Hospital with provincial assistance is at present under consideration. A serious condition has arisen through lack of accommodation at this Victoria institution, and this may be increased by requirements of the Provincial Health Insurance Act.

At present the Provincial Government grants hospitals 70 cents per day for each patient. The proposed increase would raise this amount to \$1.20 in large hospitals and 80 cents in the smallest institutions. It is planned that the Government place the additional money into a credit account for the hospitals. This would be released only on the recommendation of the Government. Hospitals would be able to borrow in excess of their annual grant but not an amount greater than their five-year total. Statutory grants to hospitals in the year ending March 31, 1937, totalled \$750,000, plus supplementary grants of \$200,000. Estimates for the year ending March 31, 1938, place grants at \$775,000. Under the scheme the Government would be required to budget for an additional \$500,000. The scheme would be an equitable solution of the capital expenditure program for hospitals now necessary in British Columbia.

Plans and estimates for an addition to the Vancouver General Hospital are being prepared by the Provincial Architect, and preliminary sketches will soon be ready for inspection. At a meeting of the Board of Directors on March 18th a resolution was passed to inform the City Council of the seriousness of the situation with regard to lack of accommodation, in order that construction might be started as soon as a course of action has been decided upon by the Council. It is expected that financing of the construction will become a matter for joint action by the city, Provincial Government, and hospital board. The suggested rate of \$3.50 per day for patients treated under the proposed health insurance scheme was accepted by the Board, with the proviso that capacity be considered. Dr. M. R. Caverhill was appointed to the position of second assistant superintendent in place of Dr. Jack Wright who has joined the staff of the Government Clinic for Venereal Disease.

Building operations will be commenced shortly on the addition to St. Joseph's General Hospital at Comox. The total cost of the improvements is estimated at \$75,000. The new addition to the hospital will be of frame and brick veneer, 145 by 42 feet, three storeys high, with basement. An extra storey, 40 by 90 feet, will also be added to the existing building.

At the annual meeting of the Board of Directors of the Princeton General Hospital an operating surplus of \$2,163 was reported. Contract has been awarded for erection of a nurses' home to cost approximately \$7,000.

The municipality of Burnaby, situated between Vancouver and New Westminster, has decided against the proposal to join the recently created Metropolitan Health Board of Vancouver and adjoining and neighbouring municipalities.

D. E. H. CLEVELAND

Manitoba

Recently Winnipeg has entertained some notable medical visitors. On March 22nd a party from the American College of Surgeons en route to a meeting at Edmonton stopped off at Winnipeg. They were entertained at lunch at the Manitoba Club by the Manitoba members of the American College of Surgeons and to dinner by the Surgeons' Club of Winnipeg. In the evening there was a special meeting of the Winnipeg Medical Society, which was addressed by Dr. George Crile, of Cleveland, on "The Surgical Treatment of Hypertension"; Dr. Alfred W. Adson, Rochester, Minn., on "Brain Tumours"; Dr. Michael A. Mason, on "Infections of the Hand", and Dr. Gordon B. New, Rochester, Minn., on "Tumours of the Neck". These addresses were greatly appreciated. Other members of the party were Drs. Perry G. Goldsmith, Toronto; Dr. Charles L. Scudder, Boston, and Bowen C. Crowell of Chicago.

Dr. Maude E. Abbott was in Winnipeg from March 30th to April 3rd. On April 1st she gave a most interesting clinic at the Children's Hospital on "Congenital Heart Disease". She was also present at the clinical luncheon at the Winnipeg General Hospital, where she was introduced by Professor Wm. Boyd.

Work was begun on a new building on the grounds of the Winnipeg General Hospital which will house the new x-ray therapy plant. The building and equipment are the gift of Mr. J. A. Forlong, of Winnipeg.

ROSS MITCHELL

New Brunswick

Hon. Dr. W. F. Roberts, at the recent session of the Legislature, presented a most comprehensive report on the work of his department of Public Health. Dr. Roberts touched on the question of sterilization, and decided that at the moment no measure implementing sterilization of the unfit should be introduced. The Minister stated that careful thought was being given to a program designed to look after cases which are not suitable for admission to a mental hospital but nevertheless require some form of custodial care and special educational measures.

Dr. Roberts reported that during the last year, 18,000 children were given treatment against diphtheria. In the past seven years 100,000 children have been protected and the death rate from diphtheria last year was but slightly more than one-third of that of 1929 and less than one-fifth of that of 1920. Typhoid fever, he stated, is gradually disappearing due to the efforts of the Public Health Department. The Minister stated that his department was advancing in every way possible cancer education both among the medical profession and the laity.

In the report of the Provincial Hospital, Dr. E. C. Menzies stated that insulin had been used on suitable cases in that institution in the treatment of certain types of insanity. First treatments were instituted last September. Dr. W. O. McDonald has collaborated with Dr. Menzies in the exhibition of insulin in chosen cases.



SHOWN IN THEIR TRUE LIGHT



WHAT physician hasn't encountered this clinical picture? Vague symptoms . . . moderate pain . . . swelling. If such cases are treated purely symptomatically, the condition may become progressively more complicated instead of being relieved. So, as surely as pain and swelling in certain areas suggest possible bone disease, they also should suggest immediate x-ray

examination. Radiography can render invaluable diagnostic assistance, for the findings practically always permit determination of the true nature of the condition, as well as the prognosis.

Every patient complaining of localized pain and swelling should receive the benefit of early radiography . . . early enough to make treatment efficacious and results

most satisfactory. If bone disease is suspected, no examination can be considered complete without the benefit of a thorough radiographic study. The facts that can be elicited from the radiologist's findings often may prove to be the most important factor in the entire diagnostic procedure. Canadian Kodak Co., Limited, Toronto, Ontario.

RADIOGRAPHS PROVIDE DIAGNOSTIC FACTS

In the report from the Provincial Hospital for the Insane, Dr. E. C. Menzies stated that during 1936, 341 new cases were admitted to the institution. At the end of October, 1936, there were 1,006 cases in this hospital.

Dr. P. M. Knox, Superintendent of the Jordan Memorial Sanitarium, drew the attention of the Legislature to the fact that an appallingly high percentage of cases admitted to the institution were in the advanced stages of tuberculosis. Dr. Knox states that public opinion must be educated to a clearer knowledge of the character of tuberculosis, its symptoms, its insidiousness, and the relative ease of diagnosis in early stages, particularly by use of the x-ray.

The Saint John Tuberculosis Hospital reports, among other interesting things, a considerable amount of surgery being done in the sanitarium. During the fiscal year of 1935-36, 2,682 pneumothorax treatments were given. Thoracoplastic operations were reported as follows:—Number of cases having one stage, 7; having two stages, 15; having three stages, 7; having four stages, 1; making a total number of 62. Eight superior laryngeal injections, 2 proctoscopic examinations, and 3 cystoscopic examinations were done, as well as one bronchoscopic examination. Twenty-four aspirations of the chest and 12 miscellaneous aspirations are reported. Intrapleural pneumolysis was done in 11 cases, 1 operation for spinal fusion (Albee), and 3 spinal fusions (Hibbs) are reported.

One hundred and fifty miscellaneous surgical operations major and minor, were recorded in the past year. It is a notable fact that surgery on tuberculosis patients is much more successful when it is possible to provide for the surgery in the sanitarium rather than to remove such a patient to a general hospital perhaps at a considerable distance. Institutional surgery has been the rule at the Saint John Tuberculosis Hospital for the last ten years.

At the regular monthly meeting of the Saint John Medical Society, in March, Dr. George M. White was the special speaker. Dr. White read a paper on "Cardiac disease complicating pregnancy". He presented a summary of the literature as well as some figures from his own practice. The attendance at the meeting was large and the discussion was brisk.

At the last session of the New Brunswick Legislature a bill concerning chiropractors was successfully put through the committee stage, but was withdrawn before it reached the point of discussion in the Legislative Assembly.

At the annual meeting of the Council of the College of Physicians and Surgeons of New Brunswick, recently held in Fredericton, Dr. W. W. White was elected President and Dr. J. M. Barry was re-elected Registrar.

During the early part of March New Brunswick, with the other Maritime Provinces, was privileged to entertain Principal Morgan of McGill. The Principal spoke in this province at several functions held in Fredericton, Sackville and Saint John. A. S. KIRKLAND

Nova Scotia

The town of Lunenburg was seriously affected by the recent epidemic of influenza. No less than 300 cases were reported, of whom 150 were school children. Matters were so serious that schools, theatres and churches were ordered closed by the Medical Officer of Health, Dr. Russell Zinck.

The Dominion Coal Company has purchased three modern motor ambulances. Two will be used in the

Glace Bay district and one in that of New Waterford. These will be available for day and night calls.

A strip of land, 400 ft. long and 80 ft. wide, has been given to the Highland View Hospital at Amherst for the erection of an annex to house cases of tuberculosis. A bill to that end was approved by a Committee of the Provincial Legislature.

A suggestion has been put forward by Dr. Norman Bethune, now in Spain, that a Nova Scotia schooner be chartered to take medical supplies, food and clothing across the Atlantic. So far the suggestion does not seem to have been considered feasible.

The annual report of the Director of Child Welfare tabled in the Provincial Legislature urges the adoption of sterilization measures to solve the problem of delinquent children. "Further, it is urged that amendments be made to the Provincial Marriage Act and the Child Protection Act to prevent the propagation of the 'feeble-minded and degenerate'". It is claimed that these Acts are not stringent enough and that the Acts of New Brunswick and Saskatchewan provide such safeguards.

A total of 304 patients were admitted to the Nova Scotia Hospital for the year ending November 30, 1936. Of these 174 were males. The number under treatment for the year was 835, of whom 477 were males and 358 females. During the year 171 males and 167 females were discharged. At the end of the year 497 were still on the register, of whom 306 were males. Of the discharged patients 93 were reported recovered, 63 improved, 147 were unchanged, and 35 had died. The admission rate averaged 25 per month.

The ratepayers of Kentville, by a majority of 341 to 122, approved the proposal of the Hospital Commission to erect a new hospital. Members of the Commission intimated that building operations will probably be undertaken during the summer.

In the local legislature Dr. W. W. Patton urged the erection of a psychopathic hospital unit for treatment of drug addicts, psychoneurotics and similar cases. He claimed that such a unit would be the only one of its kind in the Maritimes.

It is interesting too, to note, that in the speech from the throne legislation will be introduced to effect changes in the Victoria General Hospital.

In the annual report of the Victoria General Hospital, mention is made of the increase to the number of patients suffering from cancer. During the year there were 353 cases out of a total of 5,616 admissions. Of these cancer cases 140 were new. Of the private and out-patient cases 159 were suffering from cancer, making a total of 512 for the year.

The annual report of the Superintendent of the Nova Scotia Sanatorium at Kentville has been issued. Two hundred and eighty-eight patients were admitted. Of these 114 were re-admissions. The total treated numbered 621, of whom 271 were discharged. Stress is laid on the fact that 73 per cent of the patients receiving artificial pneumothorax treatment were able to return home, free from the danger of infecting others. The daily cost per patient was \$2.90, as compared with \$3.16 for the previous year.

N. B. DREYER

Quebec

Edward W. Archibald, B.A., M.D., C.M., Hon. F.R.C.S.(Eng.), F.R.C.S.(C), Professor of Surgery at McGill University, Montreal, has been unanimously nominated for an honorary doctorate in the University



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of Paris by a committee of the Paris Faculty of Medicine.

Dr. Archibald pioneered in the alleviation and cure of certain forms of advanced pulmonary tuberculosis, for which he was awarded the coveted Trudeau medal of the National Tuberculosis Association. A graduate of McGill University, he has served on the university staff since 1902, and is now chairman of the department of surgery. He was formerly chief surgeon at the Royal Victoria Hospital, and is known and honoured throughout the world for his achievements in surgery.

Dr. W. F. Hamilton was the recipient on March 19th of a marble ink stand on the occasion of his retirement as chairman of the medical board of the Royal Victoria Hospital. The gift, bearing the facsimile signatures of all members of the board in silver, was tendered Dr. Hamilton in recognition and appreciation of his services to the hospital and its medical board.

Accepting the gift, presented at the hospital's annual meeting, Dr. Hamilton briefly reviewed his career from the time he became a member of the staff of the Royal Victoria, covering a period of over forty years. He expressed the hope that the future development of the hospital would be as fruitful as in the past and that the present members of the medical board would continue the same happy associations he had enjoyed with the hospital.

Dr. H. Oertel has been appointed successor to Dr. Hamilton as chairman of the medical board.

Saskatchewan

The Red Cross Society of Saskatchewan is now operating 6 outpost hospitals. In 1936 they cared for 867 cases in hospital. Of these 290 were maternity cases. There were 9 still-births and no maternal deaths. There were 370 medical cases. There were 153 operations and 53 accident cases. The total number of deaths was 22. There were 792 outpatients, and 153 nursing visits were paid in the homes. The average cost per patient per day in all outposts was \$1.69. In estimating the cost per patient per day, donations and labour have been included.

Dr. Lillian Chase addressed the March meeting of the Regina and District Medical Society on "The first year's experience with protamine insulin and protamine zinc insulin". Her practice is to give a large dose of protamine zinc insulin an hour and a half before breakfast in addition to a small dose of the unmodified insulin immediately before breakfast. In some cases the dose of unmodified insulin is not needed. Difficulties encountered are reactions after midnight in patients who are sugar-free at 10 p.m. The patients are given three meals and three lunches. Only one-fifth of the day's carbohydrate allowance is given for breakfast.

LILLIAN A. CHASE

United States

The American Association for the Study of Goitre.

—The Annual Meeting will be held in Detroit, Michigan, June 14, 15, 16, 1937, with headquarters at the Book-Cadillac Hotel.

A comprehensive program has been prepared. Among the contributors we note the names of the following Canadians—Drs. J. B. Collip, D. O. Donovan and A. L. Lockwood. The secretary is Dr. W. Blair Mosser, Kane, Pa., U.S.A.

Book Reviews

An Introduction to Medical Science. William Boyd, M.D., M.R.C.P., F.R.C.P., Dipl. Psych., F.R.S.(C.), Professor of Pathology, University of Manitoba. 307 pages, illustrated. Price \$3.50. Lea & Febiger, Philadelphia, 1937.

As its title implies, this book is but an "introduction" and is designed, as stated by the author, "to give an aeroplane view of disease" only. It is particularly suitable for use by the student nurse, by the premedical student who desires a general idea of his future studies, and by the hospital technician who desires a more intelligent knowledge of the field of medicine. The chief object of the author is to show that the closest relationship exists between pathological changes and the symptoms of the patient.

The book is divided into three sections: Part I dealing with the general principles of disease, including bacterial and parasitic infections and allergy; Part II, the major portion, reviews the various organs and their more common diseases, and Part III embodies two "Practical Applications", the prevention of disease and the nurse and the laboratory. Technical terminology has been minimized, the illustrations are apt and interesting, and the text is well written. Sound in its approach and factual material, the book can be recommended without hesitation to those groups for whose benefit it has been designed.

A Textbook of Surgery. Edited by Frederick Christopher, B.S., M.D., F.A.C.S., Associate Professor of Surgery, Northwestern University Medical School. 1608 pages, illustrated. Price \$11.00. W. B. Saunders, London and Philadelphia; Mc-Ainsh & Co., Toronto, 1936.

Here is a volume of 1608 pages, printed in type that is rather small than large, and a good quarter of it in still smaller type, which the poor but honest reviewer is required to—well, to review.

The first comment to be made is that we have here a book written by specialists for students who have no concern with specialties. In Dr. Christopher's preface the first sentence reads as follows: "The dominant plan of this text-book is to give the student a concise presentation of Surgery which is characterized by the maximum authority". Now this is a concept which on the surface sounds unusually promising, but what is the result? The result is, first, that Dr. Christopher has gathered about him a small but competent band of "authorities", numbering precisely 189!; and, secondly, that, to employ them all, the various subdivisions of surgery are again subdivided almost down to the atomic state. One of Christopher's own very infrequent contributions, that upon malignant vascular tumours, consisting of two lines and one word, might almost be called a proton (or is it neutron?). Let us take a few examples of this extraordinary process of subdivision.

Chapter V, on "The Skin and Subjacent Tissues," is made up of eight sections, which are contributed by seven different men. "Tendons and Fascial Spaces" has four sections, with four different authors. "The Nervous System" consists of eighteen sections, contributed by fifteen different men. "Orthopaedic Surgery" of twelve sections, by twelve different men. The chapter on Fractures has twenty sections, with nineteen different contributors. One guesses that poor Dr. Christopher must often have felt like the old woman who lived in a shoe. To manage such a brood of "authoritative" children and keep them from tumbling over each other must have been a terrific task. America has generally been considered the particular paradise of specialists, but to introduce the principle of specialism, and push it to the nth degree in a students' textbook, seems to the reviewer of dubious value.

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Diphtheria Toxoid	Staphylococcus Toxoid
Old Tuberculin	Tetanus Antitoxin
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It is true that a surgeon who has investigated with particular care the subject, let us say, of tumours of bone, which is here written by Geschickter, an acknowledged authority, may be able to present that subject to the student in a more authoritative way than the surgeon who attempts to write a surgical textbook off his own bat. But a natural conclusion from any such argument would be that Osler certainly fell short of the best when he wrote his "Practice of Medicine". Of course, if we consider the large systems of surgery in many volumes, the plan of securing particularly qualified men to undertake the various large divisions of surgical science is inevitable, because the level aimed at approaches that of the monograph, and the clientèle is definitely the general body of surgeons trained or in training. Even so, in the largest of these the number of contributors is hardly half of the flock here gathered together for the instruction of the undergraduate.

But there is a positive reason against Dr. Christopher's plan, and that is the well-known difficulty in seeing the wood because of the trees. In this sense one cannot but point out the decidedly exiguous presentation of general principles, and, *per contra*, the excessive space devoted to presenting hard facts. There is too much appeal under this plan to memory and too little to reason. That, of course, is a general fault of most surgical textbooks that have appeared in the last decade or two, even when compiled by one or two surgeons. But the objection becomes particularly valid with 189 contributors. In fairness one must say that there are exceptions, and notable ones. One may cite, for instance, Meleney's chapter on the Pathology of Surgery, and Seringer's on Wounds; and one might mention several others.

There is no doubt however, in spite of all this, that this book is an exceedingly able presentation of modern surgical knowledge and practice. It contains many chapters which are of a high order of merit for the education of students, but its value is rather uneven, and it lacks the controlling influence of the scientific surgeon-author.

A Hand-Book of Ocular Therapeutics. Sanford R. Gifford, M.A., M.D., F.A.C.S., Professor of Ophthalmology, Northwestern University, Chicago, etc. Second ed., 341 pages, illustrated. Price \$3.75. Lea & Febiger, Philadelphia, 1937.

This work first appeared in 1932 and was designed to supply the need for a concise and up-to-date book in English on the therapeutics of the eye. The second edition follows the plan of the first, but, with experience, certain opinions expressed in the latter have been modified and the newer remedial agents and procedures have been considered. The work deals with, first, the plan and equipment of the eye specialist's office; the various anaesthetics, narcotics and hypnotics; the drugs and organ derivatives used in ophthalmology; specific and non-specific protein therapy; physical therapy; and the regional diseases and injuries of the eye. The chapter on physical therapy has been revised and in large part re-written. Additional matter, not found in the first edition, deals with the vitamins and glandular extracts as they concern ophthalmology, the use of heat and cold, contact dermatitis of the lids, certain types of keratitis and corneal dystrophy, and there is a short chapter on diseases of the orbit. A list of drugs which are useful in treating the eye is given, with their doses and indications. Specially important statements are italicized. Short bibliographies are appended to the various chapters. Pathogenesis and diagnosis are not emphasized, but are only discussed when they have some special importance in regard to treatment. The book, then, is essentially practical. It is well and pleasingly written, and gives the author's opinions or those of other outstanding ophthalmologists. It is compact and the various topics are easily accessible.

The wide experience of the author qualifies him to speak with authority. The book will be of value to the general practitioner, working in remote parts, who is called upon to treat the eye on his own responsibility, and to the specialist who wishes to have the latest information in a short compass. An excellent book.

Practical Orthoptics in the Treatment of Squint.

Keith Lyle, M.A., M.D., F.R.C.S., Assistant Surgeon, Royal Westminster Ophthalmic Hospital, and Sylvia Jackson, S.R.N. 212 pages, illustrated. Price 12s. 6d. H. K. Lewis & Co., London, 1937.

The first chapter of this book takes up the management of the Orthoptic Clinic, patterned after the first clinic of this kind in England, that established at the Royal Westminster Ophthalmic Hospital. Instruments such as the synoptophore, descended from the old amblyoscope, are described, and their use explained with considerable detail. Methods of examination, principles of operation, different forms of squint, including concomitant and paralytic, and different forms of heterophoria are taken up and their treatment explained.

This volume forms a comprehensive and readable story of a very important part of ophthalmic practice, and with its numerous illustrations and tables should be of great value to those especially interested in this class of work. It is well printed and designed, providing a practical manual for students in orthoptic practice—a part of ophthalmology which at the present time is very much to the fore.

A Preface to Nervous Disease. Stanley Cobb, A.B., M.D., Bullard Professor of Neuropathology, Harvard Medical School. 173 pages. Price \$2.50. William Wood, Baltimore, 1936.

This brochure may be recommended with unqualified approval to all those interested in disorders of the nervous system. One has come to expect much from Dr. Cobb and certainly he has not disappointed us here. Criticism might be levelled at the choice of title. This is no mere elementary precursor to routine neurology, but a scholarly and provocative work presented in an unusually attractive and succinct fashion. The most commendable feature is the breadth of purview. It is excessively rare to find an excellent discussion of consciousness and mind-body relationships in books of this type. Far too long have neurology and psychiatry remained in logic-tight compartments, and such coordinating efforts as this can hardly be too highly commended.

The author's introduction, presenting all science as a polyhedron whose apex is philosophy and whose base the fundamental measureable sciences, gives an indication of the lines of approach, and forms an admirable preliminary to the thorough stimulating discussion of integration which follows later. Admirable presentations of the segmental and supra-segmental levels in the central nervous system, of special aspects of histopathology, and the final chapter on epilepsy and the psychoses constitute but some of the many worthwhile features.

The present reviewer's only criticism is that Dr. Cobb has perhaps sacrificed a little too much on the altar of brevity. So compact a work tends to somewhat laborious reading, quite unnecessary in such an intrinsically fascinating production.

Bright's Disease and Arterial Hypertension. W. J. Stone, B.Sc., M.D., F.A.C.P., Clinical Professor of Medicine, University of Southern California. 352 pages, illustrated. Price \$5.50. W. B. Saunders, Philadelphia and London; McAinsh, Toronto, 1936.

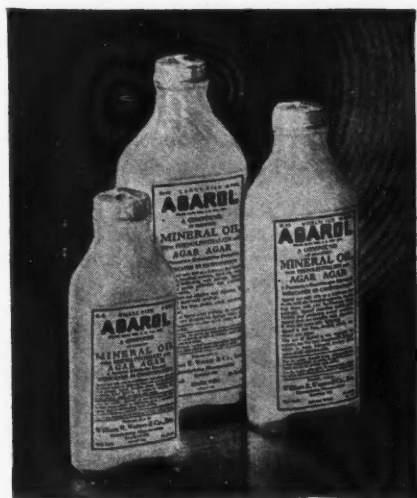
An excellent readable book giving short historical accounts, and the development and status of present views on the subject of Bright's disease. The book is written primarily for practitioners of medicine, but the



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more advanced student will find much meat in short reading time. The subject matter is covered in twenty rather concise chapters, with extensive references at the end of each. The clinical features are stressed throughout but without detracting from the recent laboratory advances. One chapter is devoted to admirable abstracts of 123 cases studied with autopsy findings.

Still another classification of nephritis appears. However, clinical groupings are simple and the reader has no difficulty in following the description of the clinical course and treatment of the disease. The final year student will find excellent chapters with summaries, on "Physiology of Kidney Function, Water Balance, Edema, and Kidney Function Tests".

This book is highly recommended to students, teachers and practitioners of medicine as a concise up-to-date presentation of the subject of Bright's disease and arterial hypertension.

Skin Diseases in Children. Geo. M. McKee, M.D., Professor of Clinical Dermatology and Syphilology, New York Post-Graduate Medical School, Columbia University, New York, and Anthony C. Cipollaro, M.D., Associate in Dermatology and Syphilology, New York Post-Graduate Medical School. 345 pages, illustrated. Price \$5.50. Paul B. Hoeber, New York and London, 1936.

In their preface the authors of this book state a proposition which should meet with ready and general acceptance—"The family medical adviser and the paediatrician should be able to recognize the very common cutaneous affections, and he should be able to treat many of them successfully." Their book should be of much help to those who have the medical care of children.

The clinical signs of a large number of skin diseases which may occur in childhood are enumerated briefly and clearly, their course described, and a summary of the methods employed in their treatment is given. Photographs are numerous and good. The infectious exanthemata are not included, since they receive adequate consideration in textbooks of general medicine and paediatrics. Pathology and debatable points relating to etiology are not entered upon, for equally obvious reasons.

Treatment is up-to-date, including references to such recent measures as the use of aloe vera in radiodermatitis. For the most part newer remedies, while mentioned, are accompanied by appropriate cautions against abandoning the old and tried for the new and untried. It is rather surprising to encounter the statement that 10 per cent ammoniated mercury ointment is the routine strength for impetigo in adolescents and adults, and that 3 per cent is sufficiently strong for a child. Adults often show severe symptoms of intolerance with the latter strength. It is also noted that butesin picrate is mentioned in the treatment of burns, albeit with a warning, although dermatitis rather commonly results from its use. The brief chapter on the care of the skin is sane and well-balanced, and should be very useful.

The handy size of the book and the compression of material without sacrifice of essentials make it a book that every general practitioner and paediatrician should find of daily use, and as such it is warmly recommended. In later editions it is hoped that fewer typographical errors will be found.

The Lung. William S. Miller, M.D. 209 pages, illustrated. Price \$7.50. C. C. Thomas, Springfield and Baltimore, 1937.

Dr. Miller's study of lung structure has extended over a great many years. His name appears in the literature on this subject like a steadily growing central pier. Now he is setting a crown on this by bringing his work together under one cover. The book is an extraordinary example of how much can be compressed into a small compass. This is largely due to the unusual

number of illustrations, which in turn owe much of their effect to their very high quality. Colour too has been used, with the greatest judgment and to an extent not often found. The text requires close attention, as is natural where there has been such compression, but the style is clear. Dr. Miller has adopted the B.N.A. terminology for the air spaces, which is certainly the most easily grasped of the many groups of terms. He brings out with great clearness the importance of the dual blood supply of the lung, and comments on the significance of the fact that it is in the area of transition from the bronchial to the pulmonary arteries that tuberculosis has its origin most commonly. In his opinion alveolar pores are not normal structures but result from a pathological process which causes stripping of the epithelium on opposite sides of the alveolar wall. No mention is made of Macklin's work on this point. It may be that although Dr. Miller's evidence is very strongly in favour of his opinions quoted, there is more yet to be said before the point can be considered as finally settled.

Dietetics for the Clinician. Milton A. Bridges, B.S., M.D., F.A.C.P. Third ed., 1055 pages. Price \$10.00. Lea & Febiger, Philadelphia, 1937.

Two previous editions have been favourably reviewed in these columns within four years. In this third edition more attention is paid to the values of foods as prepared for the table, thus giving information of much more value than with tables based upon raw foods. Further knowledge of foods and nutrition have necessitated changes in the menus prescribed for disease—a valuable part of the work. The comprehensive reference tables in the appendix are most useful.

Rural Health Practice. Harry S. Mustard, M.D., Associate Professor, Public Health Administration, School of Hygiene and Public Health, Johns Hopkins University. 603 pages, illustrated. Price \$4.00. The Commonwealth Fund, New York, 1936.

It is unusual to review, within a short period, two such excellent publications, by the same author, as "An Introduction to Public Health" and "Rural Health Practice". The only explanation for the author's accomplishment, which occurs to the reviewer, is that Doctor Mustard, after some years of wide experience during which he "has already made most of the mistakes" is now pouring out for the benefit of a large circle of readers the fruits of this experience. Despite the detail in which the various items are dealt with, the book is at all times readable, and usually, one might say, entertaining, because the author is always alive to the human relationships involved in rural health work. It is to be hoped that the many hundreds of part-time health officers in Canada will read this description of what rural health work means and how it can be organized. Then, perhaps, they will have a greater appreciation of what is meant by adequate rural health services. Every public health worker will wish to have "Rural Health Practice" on his desk, for the basic philosophy is the same for city and country.

While the chief credit naturally goes to Doctor Mustard, an expression of appreciation to The Commonwealth Fund is in order for again making available a most desirable and valuable acquisition to the modern public health library.

British Encyclopædia of Medical Practice. Edited by Sir Humphry Rolleston, Bt. Vol. 2. 767 pages, illustrated. Price \$10.00 a volume. Butterworth & Co., London, Eng., and Toronto, 1936.

The second volume of this series includes subjects from Apraxia to Carriers in Infective Disease. It includes the writings of such authors as Alan A. Moncrieff, on Still's Disease, Geo. W. Bray, on Asthma, F. M. R. Walshe, on Ataxy, P. Manson-Bahr, on Bartonellosis, H. S. Souttar, on Breast Disease, L. S. T.

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Burrell, on Bronchiectasis, to name only a few. The articles show evidence of extremely thorough editing. The result is clear and orderly arrangement of material brought well up to date, with no waste of writing. The illustrations are carefully chosen and well reproduced. One might, however, question the value of showing pictures of instruments.

Nostrums and Quackery and Pseudo-medicine. Arthur J. Cramp, M.D., formerly Director of Bureau of Investigation of American Medical Association. Vol. 3, 232 pages. Price \$1.50. American Medical Association, Chicago, 1936.

One gathers from this book that quackery in general is still being vigorously practised. But one also learns what is being done to counteract it. As Dr. Simmons points out in a Foreword, a comparison of conditions existent thirty years ago with those of today shows a great change for the better in the "patent medicine" business; the misrepresentation and fraud which were so common in newspaper advertising have decreased, and the claims made on labels are less extravagant. All this betterment of conditions has been brought about gradually, and by a number of factors. The most effective of these probably has been the persistent efforts of the American Medical Association. These have been guided largely through Dr. Cramp, who became director of their Bureau of Investigation. This book is the third issued by the Bureau in reviewing its activities. It reveals a variety of quackery which should spur us to yet greater efforts for the education of the public.

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Materia Medica and Therapeutics. Linette A. Parker, B.Sc., R.N. Sixth edition, 377 pages, illustrated. Price \$2.50. Lea & Febiger, Philadelphia, 1936.

Nursing as a Profession. Esther L. Brown, Department of Statistics, Russell Sage Foundation. 120 pages. Price \$0.75. E. L. Hildreth & Co., Brattleboro, Vt., 1936.

Manual of Biological Assaying. James C. Munch, B.S., M.S., Ph.D., Professor of Pharmacology and Bioassays, Temple University. 179 pages. Price \$2.25. J. B. Lippincott, Philadelphia, London and Montreal, 1937.

Human Physiology. C. G. Douglas, C.M.G., M.D., D.M., F.R.S., Fellow of St. John's College, Oxford, and J. G. Priestley, M.D., D.M., Reader in Clinical Physiology, University of Oxford. Second edition, 229 pages. Price \$3.75. Oxford University Press, Toronto, 1937.

Manual for the Medical Services of the Peiping Union Medical College Hospital. Edited by F. R. Dieuaide. Fifth edition, 204 pages. Price \$1.50. For sale at Stores Division, Peiping Union Medical College, Peiping, 1936.

Aids to Pathology. Harry Campbell, M.D., F.R.C.P. and Kenneth Campbell, O.B.E., M.B., F.R.C.S. Seventh edition, 263 pages. Price 4s. 6d. Baillière, Tindall & Cox, London; Macmillan, Toronto, 1936.

Textbook of Applied Biochemistry. Frank Wokes, B.Sc., Ph.G., F.I.C., Member of Staff of Pharmacological Laboratories, College of Pharmaceutical Society of Great Britain. 522 pages, illustrated. Price \$4.50. Baillière, Tindall & Cox, London; Macmillan Co., Toronto, 1937.

Nutritive and Therapeutic Values of the Banana. 143 pages. Published by Research Department, United Fruit Company, Boston, 1936.

What is Wrong With British Diet. Harry Campbell, M.D. 253 pages. Price \$3.00. Wm. Heinemann, London; Macmillan Co., Toronto, 1936.

Handbook on Diseases of Children. Bruce Williamson, M.D., M.R.C.P., Physician to Royal Northern Hospital, London. Second edition, 329 pages, illustrated. Price \$3.00. E. & S. Livingstone, Edinburgh; Macmillan Co., Toronto, 1936.

International Clinics. Edited by Louis Hamman, M.D. Vol. 1, forty-seventh series. 310 pages, illustrated. Price \$3.00. J. B. Lippincott, Philadelphia, London and Montreal, 1937.

Organic Chemistry for Medical Students. George Barger, M.A., D.Sc., F.R.S., Hon. D.S.C., Hon. M.D. Second ed, 251 pages. Price 10/6 net. Gurney & Jackson, London; Oliver & Boyd, Edinburgh, 1936.

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Post-mortem Appearances. Joan M. Ross, M.D., B.S., M.R.C.S., L.R.C.P., Reader in Pathology, University of London. Third edition, 243 pages. Price \$2.25. Oxford University Press, London; McAlinsh & Co., Toronto, 1937.

Principles of Diagnosis, Prognosis and Treatment. Robert Hutchison, M.D., LL.D., F.R.C.P., Consulting Physician, London Hospital and Hospital for Sick Children, Great Ormond Street. Second edition, 53 pages. Price \$1.10. John Wright & Sons, Bristol; Macmillan Co., Toronto, 1937.

Transactions of the American Association of Genito-Urinary Surgeons. Forty-eighth annual meeting held at Stockbridge, Mass., May 25-27, 1936. Vol. 29, 502 pages, illustrated. Bruce Publishing Co., Saint Paul, Minn., 1936.

Hay Fever with Special Reference to Treatment by Intranasal Ionization. Clive Shields, B.M., B.Ch., Clinical Assistant Physiotherapy Department, St. George's Hospital. 57 pages, illustrated. Price \$2.50. Oxford University Press, London; McAlinsh, Toronto, 1937.

Twenty-second Annual Report of the Board of Control for the Year 1935. Part 2, Lunacy and Mental Deficiency. 526 pages. Price \$2.15. British Library of Information, 270 Madison Ave., New York, 1936.

Light Therapy. Frank H. Krusen, M.D., Associate Professor of Physical Medicine, Mayo Foundation. Second edition, 238 pages, illustrated. Price \$3.50. P. B. Hoeber, New York, 1937.

The Harvey Lectures delivered under the auspices of the Harvey Society of New York, 1935-36. Series No. 31. 255 pages. Price \$4.00. Williams & Wilkins, Baltimore, 1936.

A Practical Medical Dictionary. Thomas L. Stedman, A.M., M.D. Thirteenth edition, 1291 pages. Price \$7.50. William Wood, Baltimore, 1936.